

Reassessing the Distributional Impact of the Child Tax Credit

Expansion: Evidence from IRS Data

Jack Landry*

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Abstract

The 2021 expansion of the Child Tax Credit made parents with no income eligible for the full value of the credit. According to typical microsimulation analysis, this change had a considerable impact, as families with no income received a larger share of the total increase in benefits from the expanded credit (18%) than families with incomes between \$1 and \$20,000 (16%). This paper shows that survey based microsimulation greatly overstates the share of benefits going to families with no income. Using aggregate IRS return data on the incomes of families who claimed the expanded credit combined with microsimulation, I find that families with no income received only 4% of the increase in benefits, while families with incomes between \$1 and \$20,000 received 30%—a sevenfold difference. The results imply that either the take-up rate among families with no income was very low in 2021, or survey data overstates the number of families with no earnings. If take-up remains unchanged, increasing the phase-in rate in a future expansion of the credit could deliver substantially more benefits to low-income families than traditional survey-based analyses suggest.

*Jain Family Institute. Email: jack.landry@jainfamilyinstitute.org This paper expands on a report from the Jain Family Institute in 2023 titled “The Impact Of Families With No Income On The Expanded Child Tax Credit.” Ratik Asokan, Alex Jacobs, and Elaine Maag provided invaluable comments. All errors are mine alone.

1 Introduction

The Child Tax Credit (CTC) has historically required parents to work to receive any benefit, and to have substantial earnings to receive the full value of the credit. In 2021, the program changed dramatically, giving all low-income parents the full value of the credit regardless of earnings. In this paper, I assess how important giving parents the full benefit with no earnings is relative to giving the full credit to families with low earnings, but not high enough to receive the full credit under the typical phase-in design.

Researchers typically use microsimulation with survey data to analyze different CTC policies, a process that requires many assumptions. For the expanded CTC, assumptions about parents' labor supply response to the expanded eligibility got a lot of scrutiny. While the expansion gave benefits to families with no earnings, this change may have also disincentivized working, which could result in net decreases in income for many parents. Analyzing this tradeoff requires assumptions about how sensitive parents' labor supply decisions are to changes in tax policy (Corinth et al. 2022; Landry 2022; Bastian 2024).

However, the impact of the expanded CTC is also sensitive to more basic assumptions. Microsimulations that analyze the CTC's effect on poverty typically rely on surveys (e.g., Goldin and Michelmore 2022; Brehm and Malkova 2023). Respondents are asked detailed questions about a household's composition and sources of income, allowing researchers to simulate tax returns under different tax rules. Yet income and household compositions reported on the survey may not be the same as what is reported to the IRS. Moreover, families ostensibly eligible for the credit may not actually file a tax return and receive it, while most analyses of the CTC assumes full participation (e.g., Burns and Fox 2022; Maag, Airi and Collyer 2024).

In this paper, rather than relying solely on survey data, I use administrative IRS data on the incomes of families who claimed the CTC in 2021 to show the distributional impact of the program.

This provides the “ground truth” impact of the expanded CTC, only counting benefits of families that actually received the credit with the income they reported to the IRS, relaxing the survey data assumptions about take-up and income reporting. To calculate the counterfactual benefits under different CTC policies, I multiply the number of returns claiming the CTC by income group (from aggregate publicly available administrative IRS data) by the benefit per return (estimated from survey-based microsimulation) to calculate the overall benefit by income group. Using survey-based microsimulation to calculate the change in benefit by income group is far less error-prone than relying on microsimulation for the whole process, as the change in benefits under different CTC policies is a fairly mechanical function of income.

My results show that 4 percent of the total benefit increase from the expanded CTC relative to the status-quo law went to families with no income. The same analysis simulating the change in benefits with survey data alone implies the increase in benefits going to families with no income is 18 percent—over four times larger than the administrative IRS data. IRS data based estimates show a much larger share of benefits went to families with some positive income, but not high enough to receive the full CTC under status-quo law due to the phase-in design. Specifically, I estimate 30 percent of benefits went to families with some income but less than \$20,000, while the comparable survey based estimate is just 16 percent. Combining these statistics, the ratio of benefits for those with \$1-20,000 of income to those with \$0 income is 7.5 using IRS data, but just .88 using survey data. The differences between survey and IRS data on the amount of benefits going to families with no income is far larger than the largest estimates of labor supply responses to the expanded CTC.

I use the same approach to estimate the distribution of benefits under different possible future CTC designs. This is a subject of much applied research, but is typically analyzed with the same survey data I show gives a biased picture of the benefits of the expanded CTC (e.g., Bastian 2023; Edelberg and Kearney 2023). Specifically, I compare a hypothetical CTC with a faster phase-in

with one that eschews a phase-in all together, giving the full value of the credit to all low income families with no work requirement. I keep the value of the credit at \$2,000 for both policies, which maximizes the targeting of the benefit for low-income families. I find the fast phase-in CTC delivers a total benefit increase slightly more than half the size of the fully refundable CTC for families with an income less than \$20,000.

2 Background on The Child Tax Credit

The Child Tax Credit originally passed in 1997 and has been expanded and modified many times since. Its basic function is to ease the financial burden that families incur when they have children, and the basic structure has remained consistent apart from the temporary expansion in 2021 (Crandall-Hollick 2021). Families with no earned income are not eligible for any benefit. Families with low earnings receive a partial benefit, as the credit is “phased-in” with earnings. Low-to-middle income families receive the full credit, with the precise income level required to receive the full amount dependent on how many children they have. The credit is then phased out for higher income families.

The 2022 child tax credit structure under the Tax Cuts and Jobs Act (TCJA) is shown below for a head of household filer (single parent) with one child.¹ Families receive up to \$2,000 per child. The credit phases out at \$.05 cents per additional dollar of earnings starting at \$200,000 for single filers and \$400,000 for joint filers. Families begin receiving a benefit when they over \$2,500 in earnings. For every dollar of income over \$2,500, the credit is worth \$.15, up until the refundability cap of \$1,500 dollars in tax year 2022. This first \$1,500 of credit is “refundable”—even if families do not have net income tax liability, they can receive \$1,500 as a cash refund. To receive the full \$2,000, families must use the credit to offset income tax liability. In this example, a family would

¹There are very small changes in the TCJA’s value by parental earnings over time—the \$2,000 per child credit is not indexed for inflation, but other tax parameters are indexed, leading to small changes.

receive the full credit when they have about \$25,000 dollars of earnings. Between \$12,500 of \$19,400 dollars of earnings, the credit does not increase in value because the family would not have any net income tax liability—they would receive the maximum refundable amount (\$1,500). Families with more children can receive the full \$2,000 credit for each child, but the phase-in structure does not change, meaning that larger families must have significantly more income to receive the full credit for all their children.

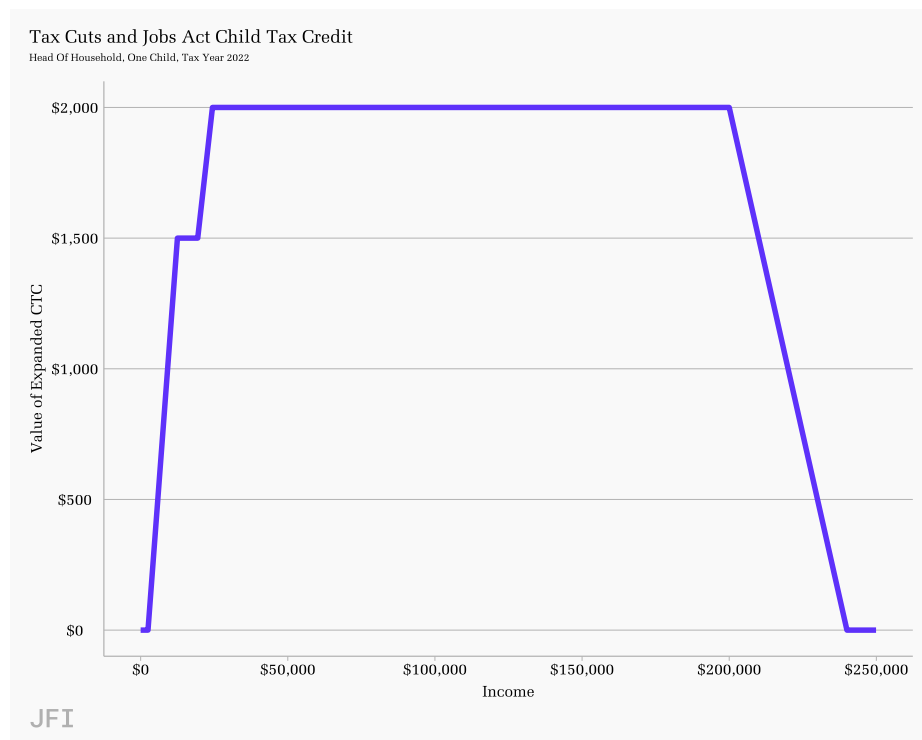


Figure 1: Value of Tax Cuts and Jobs Act Child Tax Credit for Single Filers With One Child in 2022

In tax year 2021, the American Rescue Plan Act expanded the CTC in two key ways. First, it increased the maximum credit from \$2,000 to \$3,000 per child aged 6-17 and \$3,600 per child under 6. Second, it made the credit fully refundable, meaning that families could receive the full value of the credit even if they had no earnings. The credit was also advanced to families in monthly

payments, rather than as a lump sum at the end of the year. These changes are shown in figure 2.

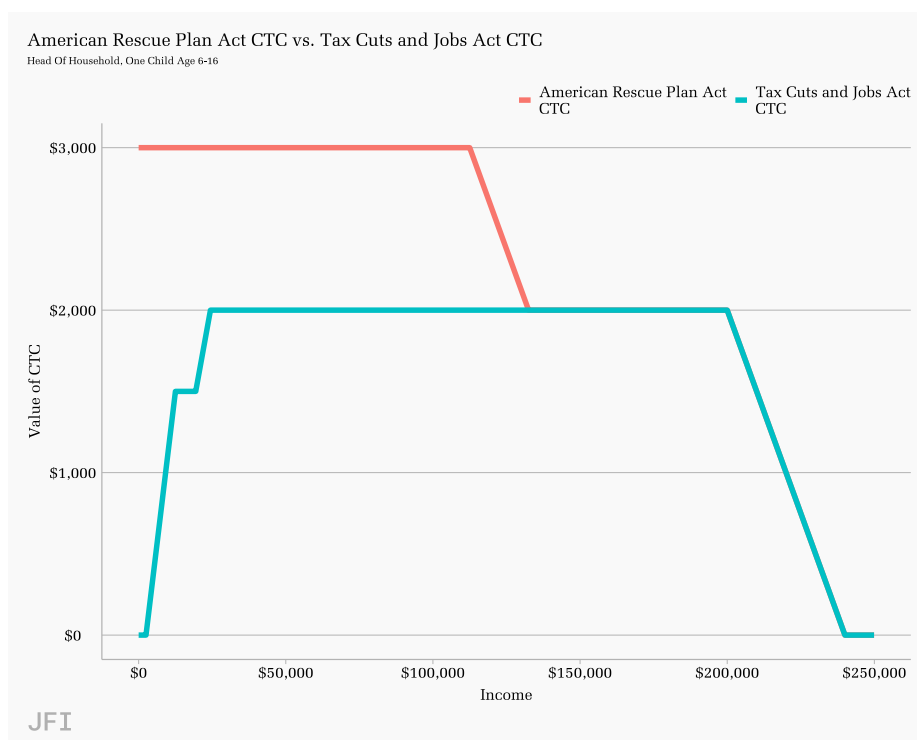


Figure 2: Value of Tax Cuts and Jobs Act Child Tax Credit vs. American Rescue Plan Act Expanded Child Tax Credit for Single Filers With One Child in 2022

2.1 Prior Microsimulation Research on the Child Tax Credit

Prior research has examined how the CTC's phase-in design left out families low or no earnings. Columbia's Center for Poverty and Social Policy estimated 9 percent of children were not eligible for any CTC benefit after the expiration of the expansion in tax year 2022 because their income was too low (below \$2,500), while 17 percent were eligible for a partial credit (Collyer et al. 2023). In contrast, the Brookings-Urban Tax Policy Center estimated 3 percent of children were not eligible for any CTC benefit because their income was too low to qualify for any credit, while 27 percent were eligible for a partial benefit (*Distribution of Tax Units and Qualifying Children by Amount of Child Tax Credit (CTC), 2022* 2022). The different estimates are shown visually in the bar graph

in figure 3.

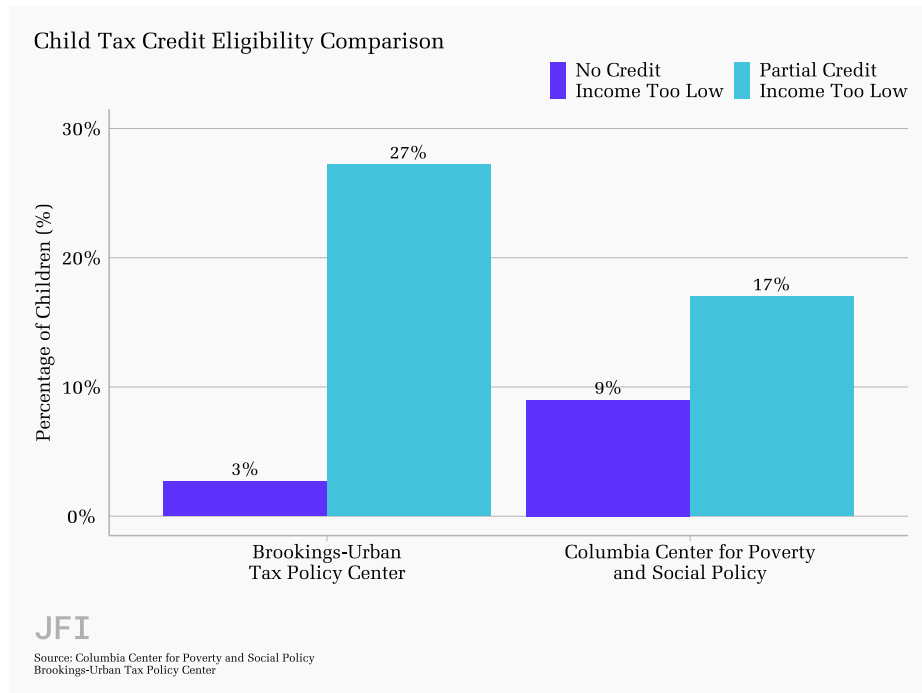


Figure 3: Fraction of Children Ineligible for the Full Child Tax Credit in Columbia’s Center for Poverty and Social Policy vs. Brookings-Urban Tax Policy Center

What explains this divergence? The Columbia estimate is based off a microsimulation using the Current Population Survey Annual Social and Economic Supplement (CPS-ASEC).² The Brookings-Urban estimate is based off a microsimulation using the Internal Revenue Service’s Public Use File (IRS-PUF), which samples from tax returns submitted to the IRS (Tax Policy Center 2022).

Both data sources have strengths and weaknesses. At first blush, estimates using the IRS data would seem to have an accuracy advantage, as they are based off actual tax returns rather than survey data that require assumptions to map to tax returns. However, use of the IRS-PUF also requires many assumptions. For instance, the Brookings-Urban tax model uses the IRS-PUF file from 2006,

²Goldin and Micheltore (2022) also analyze the children who are not eligible for the full CTC using the CPS and have similar estimates—8.7 percent receive no credit and 24.6 percent receive a partial credit based on for tax year 2017 rather than 2022. This mimics earlier estimates from the Columbia group (10 percent and 25 percent, respectively.)(Collyer, Harris and Wimer 2019).

an extrapolates results to the present day using other data and a rather opaque methodology (Tax Policy Center 2022). IRS records also do not capture non-filers. The Urban Brookings model adds non-filers from CPS-ASEC, but there is no straightforward way to identify them.³ Use of survey data does not require an extrapolation into the future and uses a relatively simple and replicable methodology, but risks measurement error from in both the mapping of households to tax returns and income reporting.

Arguably, the optimal dataset may also depend on a researcher’s goals. Putting aside the complications of using IRS data, income reported to the IRS is not necessarily always more accurate than income reported on a survey—some people misreport their income and dependents to the IRS to maximize tax benefits or minimize their tax liability (e.g. Mortenson and Whitten 2020). Moreover, IRS data does not capture the hypothetical impact on people who do not file tax returns, which (if of interest) must be added via survey data.

If researchers are interested in the number and characteristics of families who are not eligible the full CTC based on 100% take-up and households true family composition and income, survey data may be better if the discrepancy between IRS and survey data is mostly caused by misreporting in the IRS data.⁴ However, if researchers are interested in the consequences of policy changes, IRS data is a better choice, as using characteristics of actually filed returns will more closely approximate the consequences of different tax policies in terms of the tax benefits families actually receive.

A far larger literature considers the impact of different design choices of the CTC on child poverty,

³While the CPS-ASEC census tax model comes with a “non-filer” variable, it is imputed based off assumptions rather than reflecting administrative data on non-filers.

⁴Current research uses different approaches to resolve discrepancies between survey and administrative data (Meyer et al. 2021a; Bee et al. 2023).

including analyses from various think tanks,⁵ academics,⁶ and official Census Bureau publications.⁷ While not explicit about the number of families who receive no CTC, a partial CTC, or the full CTC under status quo policy, these are important inputs into any poverty analysis of CTC changes. For instance (Collyer, Wimer and Harris 2019; Duncan and Le Menestrel 2019; Ahmad, Landry and Nunez 2022; Marr, Cox, Hingtgen, Sherman, Calame and Cook 2022; Bastian 2023; Edelberg and Kearney 2023; Maag, Airi and Collyer 2024) all compare the impact of CTC designs that phase in the credit faster with income with those that make the credit fully refundable and the status-quo TCJA design. The impact of these changes will be highly sensitive to the number of families currently in the phase-in region relative to the number of families with no earned income.

Microsimulation poverty analyses seek to predict the consequences of policy changes, so even if incomes are misreported to the IRS, they should prefer IRS data to survey data, as IRS data will more closely approximate the consequences of the policy change in changes in tax benefits. However, poverty analyses almost exclusively use survey data, as administrative tax data that can be purchased from the IRS is generally not suitable to poverty analysis.⁸ For instance, it does not include data on other non-tax benefits families are receiving, a core ingredient into poverty analysis that use the Supplemental Poverty Measure. To use the IRS data for poverty analysis would require mapping IRS data on to survey data, a technically challenging and assumption laden exercise. Since the poverty analyses of the CTC rely on survey data, they will have similar numbers of families receiving a partial credit vs. no credit at all as the Columbia Poverty Center highlighted in figure 3.

⁵Examples include the Niskanen Center (Hammond and Orr 2022), the Urban Institute (Acs and Werner 2021), the Brookings Institution and Aspen Economic Strategy Group (Edelberg and Kearney 2023) and the American Enterprise Institute (Rachidi and O'Rourke 2023), the Center on Budget and Policy Priorities (Marr, Cox, Calame, Hingtgen, Fenton and Sherman 2022) and the Congressional Research Service (Crandall-Hollick, Carter and Boyle 2021)

⁶Academic analyses include (Duncan and Le Menestrel 2019; Bastian 2022; Ananat and Garfinkel 2023; Bastian 2023; Brehm and Malkova 2023; Maag, Matsui and Menefee 2023; Maag, Airi and Collyer 2024)

⁷Census Bureau publications include (Burns and Fox 2022; Creamer et al. 2022)

⁸One exception to this general pattern is Corinth et al. (2022), who use IRS data linked to the CPS-ASEC via special permission through the U.S. Census Bureau. However, their analysis primarily considers the expanded credit's impact on labor supply. Moreover, their dataset is from tax year 2016, so it cannot study how the expanded credit impacted take-up. The think tank PolicyEngine has also started to experiment with merging the IRS-PUF and CPS (Ghenis and Woodruff 2024).

2.2 Other Related Literature

The accuracy of survey data analysis of safety-net programs is the topic of a large literature. Survey response rates have declined over time, and participation in many government programs is often underreported in surveys compared to administrative records (Meyer, Mok and Sullivan 2015). When taking surveys at face value, the prevalence of extreme poverty in the United States is overestimated (Meyer et al. 2021*b*), and the poverty-reducing effects of various means-tested transfers is underestimated (Meyer and Wu 2018; Meyer and Mittag 2019).

Some literature has also recognized problems with tax imputations on surveys. Take the Earned Income Tax Credit. The official census tax model (as well as other analyses) typically assume all eligible filers receive the EITC if they appear eligible based on their survey responses (Lin 2022). However, Census Bureau research that matches CPS-ASEC records to IRS data finds that roughly 80 percent of eligible filers receive the EITC (Jones 2014; Internal Revenue Service 2024). On the other hand, some EITC filers who are not eligible for the credit receive it—the IRS estimates about 25 percent of EITC payments were issued incorrectly (Crandall-Hollick and Hughes 2018). Jones and Ziliak (2022) match IRS records to the CPS and show these issues roughly cancel out, yielding “comparable antipoverty effects” when accounting for both under and over payments.

Attention to the accuracy of survey data imputations has by and large not carried over to research on the CTC, which heavily relies on survey data to impute CTC benefits.⁹ Take-up of the expanded CTC may be an especially large problem relative to the EITC, as families with no income who typically have no requirement or benefit from filing a return are eligible for the full credit. On the other hand, efforts were made to make the CTC especially easy to claim for low-income families, with a “non-filer” portal that allowed families to claim the credit without filing a full return. Some analysis of the expanded CTC have tried to account for non-filing, rather than assuming 100%

⁹The lone exception addressing this issue for the CTC before the 2021 expansion is Meyer et al. (2022). They show shows large discrepancies between CPS imputations vs. merged CPS-IRS data across the income distribution.

participation (Acs and Werner 2021; Landry and Nuñez 2021; Parolin et al. 2021; Corinth et al. 2022). However, the methodology behind imputing tax units to be non-filers is often obtuse and is mostly based on prospective guess about how many people will be non-filers rather than comparing IRS data on payments to the number eligible.¹⁰ Moreover, virtually no research has considered the accuracy of income and dependent reporting on surveys used to impute the expanded CTCs benefits.

The lone exception to this general pattern and the research most closely related to this paper is Bee, Hokayem and Lin (2023), who compare IRS-SOI data on the expanded CTC to imputed benefits in the CPS-ASEC tax model. This paper has three primary distinctions. First, I simulate the benefits of the expanded CTC relative to the TCJA CTC, rather than the total benefit of the expanded CTC. The change in benefits is a more policy relevant parameter than the total benefit of the expanded CTC. Second, I simulate how actual claiming behavior could matter for other CTC designs that expand access to families with no income vs. those that expand access for families with low-earnings who do not receive the full \$2,000 TCJA CTC under status-quo law, but do have some positive income. Third, I provide different analyses of the IRS data—using only the number of returns by income group rather than benefits by income group, which could be biased by reconciliation with advanced payments (detailed in the appendix). Finally, my analysis uses more detail income bins—with special attention on those with no income that are fodder of much controversy in past work.

3 Data and Methodology

I evaluate the consequences of different CTC design choices by investigating the share of benefits that went to different income groups for the 2021 CTC expansion relative to what groups would have received under the pre-expansion TCJA law. While impact of different CTC designs in future

¹⁰The two analyses with clear assumptions about how they impute nonfiling reach wildly different conclusions about the extent of non-filing and its consequences for the anti-poverty effects of the expanded CTC (Landry and Nuñez 2021; Parolin et al. 2021). This illustrates the sensitivity of this approach to different assumptions.

years can vary due to income growth and dynamic labor supply responses, using 2021 data gives an opportunity to see the ground-truth impact of the expanded CTC rather than relying on simulations.

My primary analysis disaggregates the total increase in benefits from the expanded CTC by income group. To do this, I combine aggregate data from the IRS on the number of returns claiming the CTC by income group with microsimulation estimates of the benefit per return by income group for different CTC designs.

Specifically, I use the IRS's Statistics of Income (SOI) data on 2021 tax returns to analyze the incomes of families who claimed the CTC on their end of year 2021 tax return (Internal Revenue Service 2021). The IRS data provides the number of returns claiming the expanded CTC on their end-of-year 2021 tax return by adjusted gross income group. IRS-SOI data are distinct from the IRS-PUF data—the PUF includes tax-return microdata, but is only provided on a long time lag (the latest available IRS-PUF file is from 2015). IRS-SOI data provides only aggregate statistics by income group, but provide information soon after filing season.

To compute the benefits for each income group under the expanded CTC compared to the TCJA CTC, I use microsimulation. For data, I use the 2022 CPS ASEC, which provides income data for tax year 2021. To break households into distinct tax units and simulate tax return items, I use the methodology from Jones and Ziliak (2022), who show their methodology is more accurate compared to IRS records than the CPS tax model's pre-constructed tax units. Finally, to estimate the benefit per return by income group under different CTC policies, I use the Tax-Calculator microsimulation model (*Tax-Calculator Version 4.2.1* 2024). The process for each individual income group is captured by the equation below.

$$\Delta \text{Total Increase in CTC Benefit} = \text{Number of Filers (IRS Data)} \times \\
(\text{Average Benefit CTC Expansion (Microsimulation)} \\
- \text{Average Benefit TCJA CTC (Microsimulation)})$$

Using microsimulation to estimate the average CTC benefit by income group introduces some possibility for error. However, the scope for error is far smaller than using microsimulation for the entire process. The average CTC benefit by income group depends on the number of children eligible for the CTC in each income group and their precise income level. For instance, if average income among CTC filers with incomes between \$5,000 and \$10,000 was \$8,000, but the microsimulation average was \$7,000, I would slightly underestimate the CTC benefit under the TCJA. It is unclear why there would be systematic discrepancies between the ground truth IRS data and microsimulation estimates within small income ranges.

Another potential limitation of my approach are the dynamic effects of policy changes on filing behavior. My methodology takes the number of returns by income group for the expanded CTC and imputes benefits for the TCJA CTC, assuming the number of filers stayed the same. However, a more generous benefit like the expanded CTC could also increase claim rates, which would mean I overestimate the benefits from the TCJA CTC and underestimate the aggregate increase in benefits from the expanded CTC.

Only the 2021 IRS-SOI data provides the number of filers claiming the CTC, so it is difficult to provide empirical evidence about potential dynamic filing effects. However, the people most likely to newly file due to the expanded CTC are parents with no earnings who would not be eligible for any tax benefits under the TCJA. Parents eligible for a small CTC under the TCJA CTC because they

have low earnings would still be eligible for a substantial EITC. For instance, a family with \$3,000 of earnings eligible for just a \$75 TCJA CTC benefit would be eligible for a \$1,020 EITC benefit, providing a substantial incentive to file. Moreover, prior literature has found limited evidence that filing increases due to monetary incentives (Linos et al. 2022; Neumark and Williams 2020).

Finally, my analysis is limited by not accounting for potential dynamic labor supply adjustments, income growth in future years, or giving more nuanced impact figures like the effect on child poverty. These are important considerations for policy analysis. However, they also require many assumptions that have no consensus in the literature. My approach provides a point of departure for more sophisticated future analysis rooted in IRS data on the incomes of families that claimed the expanded CTC.¹¹

4 Results

4.1 Number of Filers By Income Group

Figure 4 plots the IRS-SOI data on 2021 tax returns, showing the income distribution of returns that claimed the expanded CTC on 2021 tax returns. Overall, less than 2% of total CTC filers had an adjusted gross income of \$0 or less. The small fraction of filers with no income is partly the result of many CTC returns having fairly high incomes—the modal income group for CTC filers is \$100,000 to \$200,000, with 20% of filers in that income range. However, figure 5 shows the same data, but truncates the distribution at below \$50,000 adjusted gross income. Even among filers with incomes below \$50,000, only 5% had an adjusted gross income of \$0 or less. This shows even before layering on any additional modeling, the vast majority of the recipients of the expanded CTC had positive income.

¹¹While it is possible to combine IRS data with survey data to estimate the impact of the expanded CTC on poverty, this would require many assumptions about how to map IRS data to survey data and determine the degree to which discrepancies are due to non-filing or misreporting income.

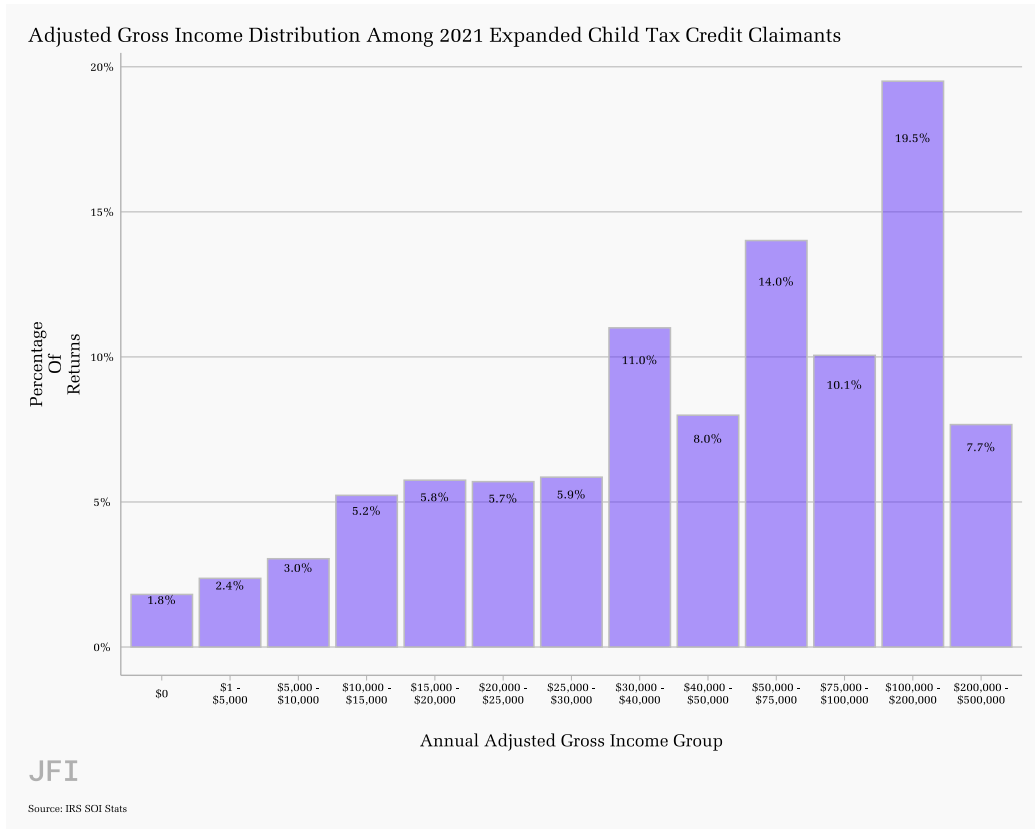


Figure 4: Number of Filers Claiming the Expanded Child Tax Credit by Adjusted Gross Income

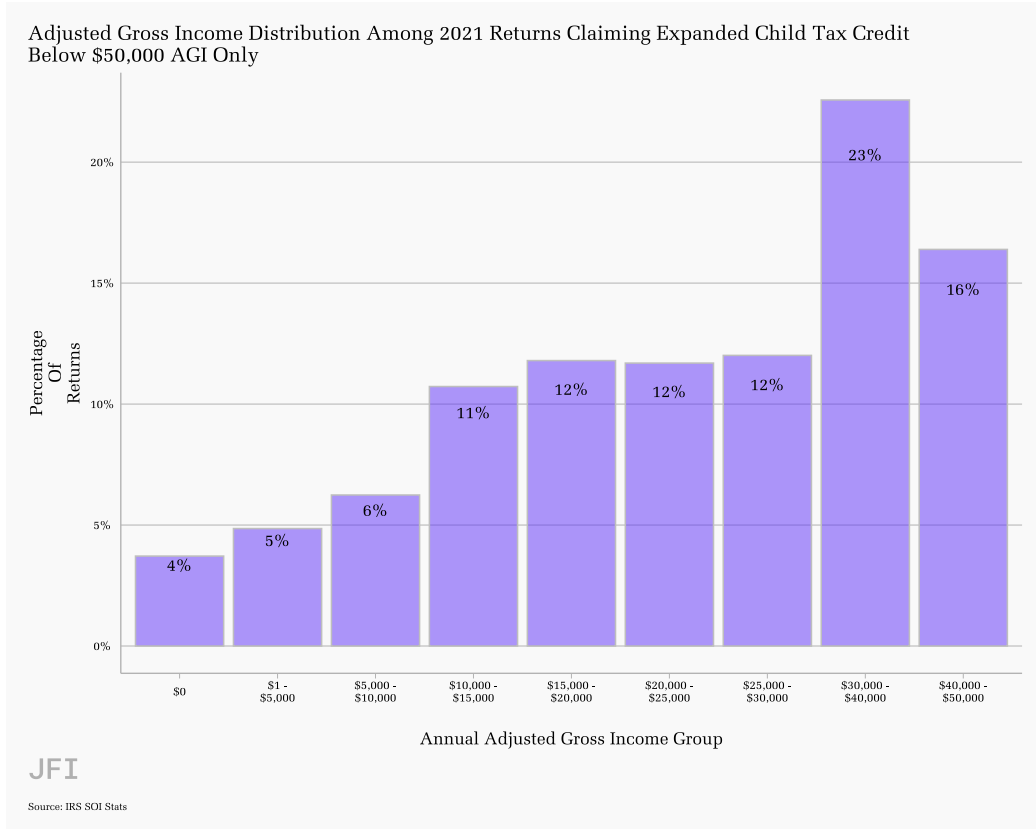


Figure 5: Number of Filers Claiming the Expanded Child Tax Credit by Adjusted Gross Income, Limited To Filers With Adjusted Gross Income Below \$50,000

4.2 Distribution of Benefits of the Expanded CTC By Income

Next, I take the number of filers by income group from the IRS data and multiply it by the average benefit per return by income group under the expanded CTC and the 2022 TCJA CTC, estimated via microsimulation as show in the equation in section 3. For each income group, I calculate the total benefit of the expanded CTC relative to the status-quo TCJA CTC by subtracting the total benefit of the expanded CTC by the total benefit of the TCJA. From there, I estimate the fraction of benefits that accrued to each income group out from the aggregate increase in benefits. This better shows the share of the total change in benefits for each income group received than the number of

filers, as lower income groups get a larger increase in benefits relative to TCJA law. The results are shown in figure 6.

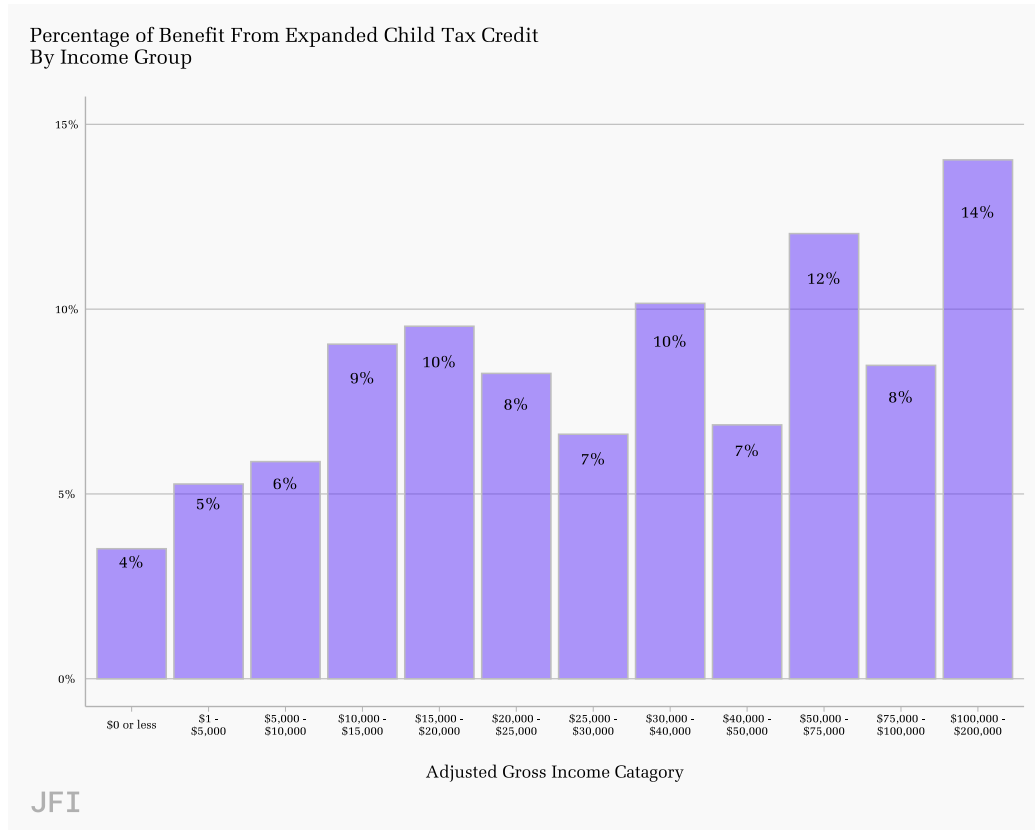


Figure 6: Distribution of Benefits of the Expanded CTC by Income Group

Overall, benefits of the expanded CTC are highly concentrated among families with low incomes. For instance, two-thirds of the increase in benefits went to families with an adjusted gross income of less than \$50,000. However, just four percent of the total increase in benefits from the expanded CTC relative to the status-quo law went to families with \$0 or less adjusted gross income. In contrast, families with incomes between \$1 and \$20,000 received 30 percent of the total benefit increase, and 32 percent went to families with incomes between \$20,000 and \$50,000.

4.3 Comparison To Survey Data Estimates

It is possible to compute the same distribution of benefits from the expanded CTC using survey based microsimulation alone. Exact comparisons to the Columbia and Urban-Brookings estimates shown in figure 3 are not possible because I rely on IRS data from when the CTC was expanded in tax year 2021, while the estimates in figure 3 are based on tax year 2022.¹² However, I can create my own estimates based on microsimulation for tax year 2021 using the same data source, which should closely approximate the Columbia estimates' methodology.¹³ Rather than multiply the number of returns in each income group by the number of returns from IRS data, I take the distribution of income reported in the survey data as given and assume all eligible filers receive the CTC.

Results are shown in figure 7. The survey data estimates that 18 percent of the total benefit increase from the expanded CTC relative to the status-quo law went to families with no income. This is over four times larger than the administrative IRS data estimate of 4 percent. In contrast, the survey data underestimates the share of benefits going to families with incomes between \$1 and \$20,000 by 12 percentage points, and the share of benefits going to families with incomes between \$20,000 and \$50,000 by 10 percentage points. Finally, the survey data overestimates the share of benefits going to families with incomes above \$50,000 by 7 percentage points. Overall, the distribution of benefits for the expanded CTC appears far more concentrated among families with low-incomes, but not *no* income than what is implied by survey data and Collyer et al. (2023). As 2021 was more impacted by the COVID-19 pandemic than 2022, the number of families with no income would likely be even smaller in 2022 had the expanded CTC been in place.

¹²I also cannot exactly replicate the number of children ineligible for any CTC because their parents' income is too low—that cutoff is at \$2,500 while the IRS data's lowest income bands are \$0 or less and \$1-\$5,000.

¹³Writ-large, there are fairly minimal differences in tax calculations when using the same underlying data source (Wheaton and Stevens 2016).

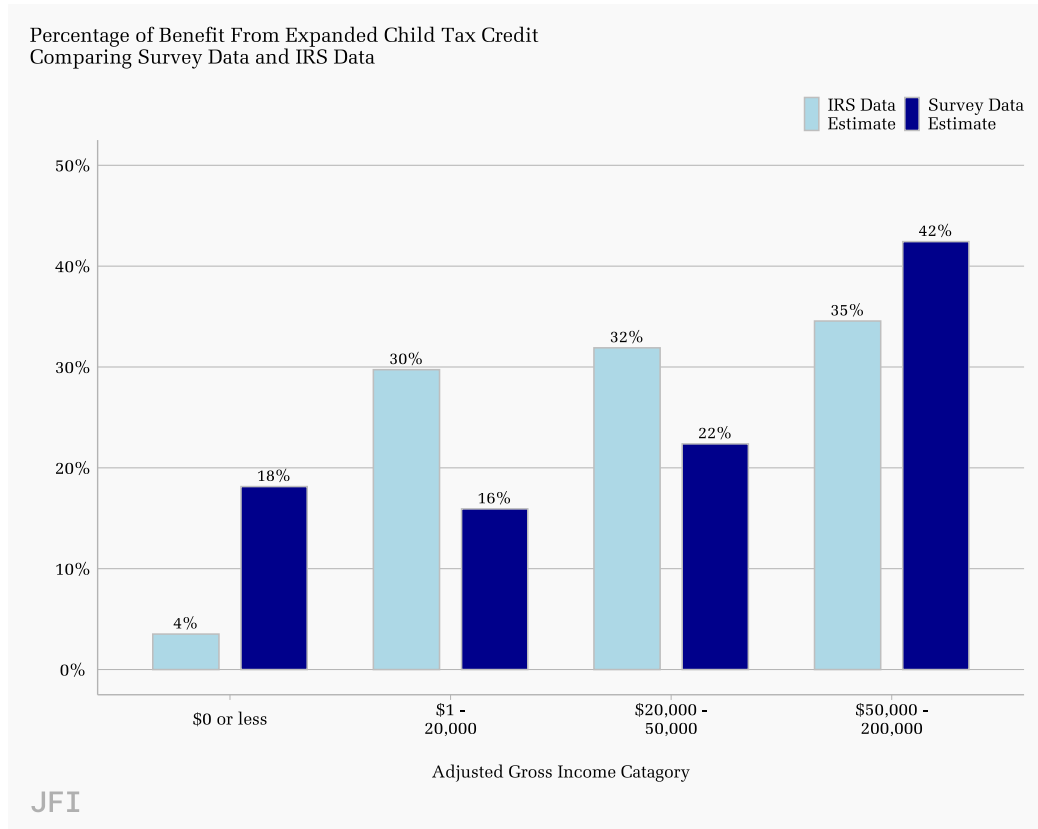


Figure 7: Distribution of Benefits of the Expanded CTC by Income Group, Comparing IRS Data Estimates to Survey Data Estimates

To give a sense of the importance of these differences, I also calculate the share of benefits that would go to families with \$0 income if the large negative labor supply predictions of Corinth et al. (2022) came true. Assumptions about labor supply responses are central to the continuing debate over the expanded CTC, and Corinth et al. (2022) is the most extreme estimate in the literature (Fenton 2023). I take their prediction of 1.5 million parents dropping out of the labor force due to the expanded CTC and assume they all have no income and independently claim the expanded CTC with the same number of children as the \$0 income group in the survey data. This would increase the share of benefits going to families with no income to 10 percent, an increase less than half of the gap between IRS and survey data estimates (6 percentage points vs. 14 percentage points).

4.4 Implications for Other Possible CTC Designs

I can use the same basic methodology to simulate the distribution of benefits of other potential CTC expansion designs. Instead of using microsimulation to estimate the average benefit for the expanded CTC by income group, I use it to compute the average benefit by income group for other hypothetical CTC designs. I still use the IRS data from 2021, which will be less accurate for estimating benefits in future years due to income and employment growth. Moreover, a alternative CTC design could have different effects on tax filing behavior, which would also change the number of CTC returns by income group. However, these drawbacks are likely minor compared to the substantial discrepancies in survey and administrative data shown in Section 4.3.

4.4.1 Fully Refundable CTC

In figure 8, I examine the distribution of benefits of making the TCJA CTC fully refundable (e.g. eliminating the phase-in of benefits by income). Part of the reason the expanded CTC offered a small fraction of benefits to families with no income was that it increased benefits for families well into the middle class. Many parents with incomes high enough to receive the full \$2,000 per child TCJA CTC got an additional benefit of \$1,000 to \$1,600 per child (see figure 2). A fully refundable CTC would exclusively increase benefits for families with low or no income who were not eligible for the full \$2,000 per child TCJA CTC. This policy was passed for tax years 2023-2025 by the House of Representatives (and a fully refundable \$1,000 credit after the expiration of the TCJA in tax year 2025), but did not advance in the Senate.

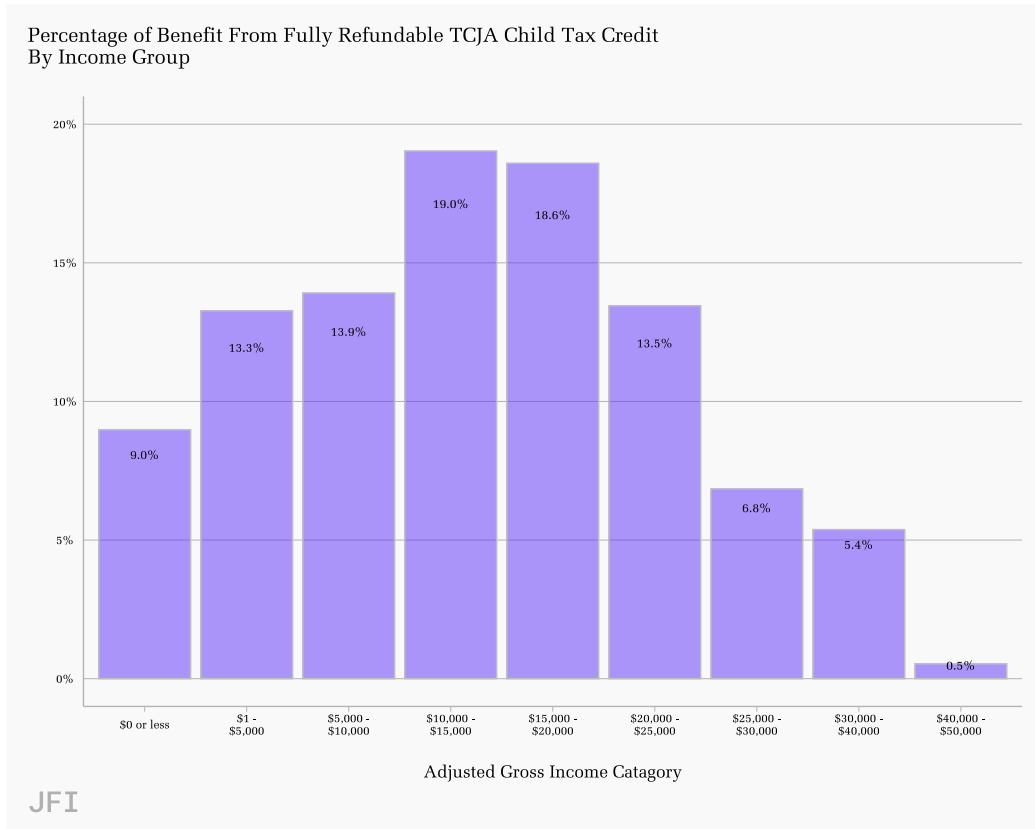


Figure 8: Distribution of Benefits of a Fully Refundable CTC by Income Group

The results show that a fully refundable CTC would still give a relatively small share of benefits to families with no income. Specially, 9 percent of the total increase in benefits would accrue to families with an adjusted gross income of \$0 or less. 65 percent of benefits would accrue to families with some positive income, but less than \$20,000 AGI.

4.4.2 CTC With Faster Phase-In

Alternatively, a CTC expansion could retain an earnings requirement, but phase the credit in faster with earnings, so that more families with low earnings receive the full credit or a larger credit. This kind of design has been proposed by a number of researchers and commentators as a way to

expand benefits to low-income families while retaining the work incentive built into the status-quo policy (Bastian 2023; Edelberg and Kearney 2023; Hammond and Orr 2022). This was also the thrust of a bipartisan bill that passed the House but failed in the Senate in 2024 (Cox et al. 2024). I simulate this general kind of policy with the following specific parameters: 1) The credit phases in at the first dollar of earnings, rather than \$2,500. 2) The credit phases in at \$.45 cents per dollar of earnings, rather than \$.15 cents. 3) The credit has no refundability cap, rather than a refundability cap at \$1,500 (2022 law). Figure 9 shows how varying these parameters' impacts the value of the CTC for a single parent (head of household filing status) with one child relative to the 2022 TCJA CTC.

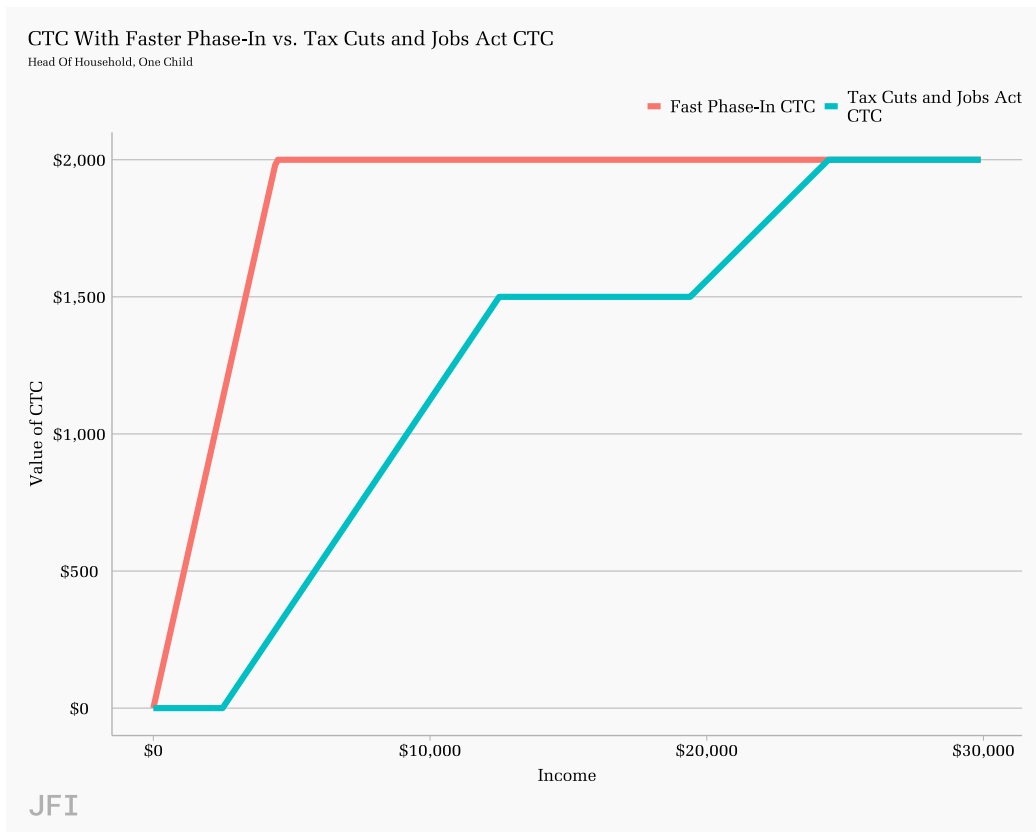


Figure 9: Comparing TCJA CTC to a CTC With a Faster Phase-In

Figure 10 shows the aggregate benefit by income group for this policy relative to both the fully refundable CTC and the TCJA CTC. As these policies expand benefits by different amounts, the total amount of benefits is important to compare in addition to their distribution across income groups. The point of this analysis is to see how much a fast phase-in benefits low income families relative to a policy that does away with the phase-in all together (the fully refundable CTC). A fast phase-in CTC does not deliver any benefits to families with no income, and only delivers meager benefits for families with very low incomes. However, for families with an AGI above \$10,000, the fast phase-in CTC has an aggregate benefit comparable (at least 80% of the size) of a fully refundable CTC, while the status-quo CTC delivers a considerably smaller benefit until AGI reaches \$30,000.

The relative importance of these changes depends on the total number of children in each category. While families with an AGI below \$10,000 have the most to gain relative to status-quo policy, there are far fewer children claimed on returns with very low incomes relative to more moderate incomes. This results in the fully refundable CTC delivering a slightly larger total increase in benefits relative to the TCJA CTC to families with an AGI between \$10,000 and \$20,000 AGI than families with an AGI less than \$10,000. There are simply far more children claimed by parents with an AGI between \$10,000 and \$20,000 than less than \$10,000. Combined with the fact that the fast phase-in CTC delivers a fairly substantial increase in benefits for families with an AGI above \$10,000, the fast phase-in CTC delivers a total benefit increase slightly more than half the size of the fully refundable CTC for families with an AGI less than \$20,000.

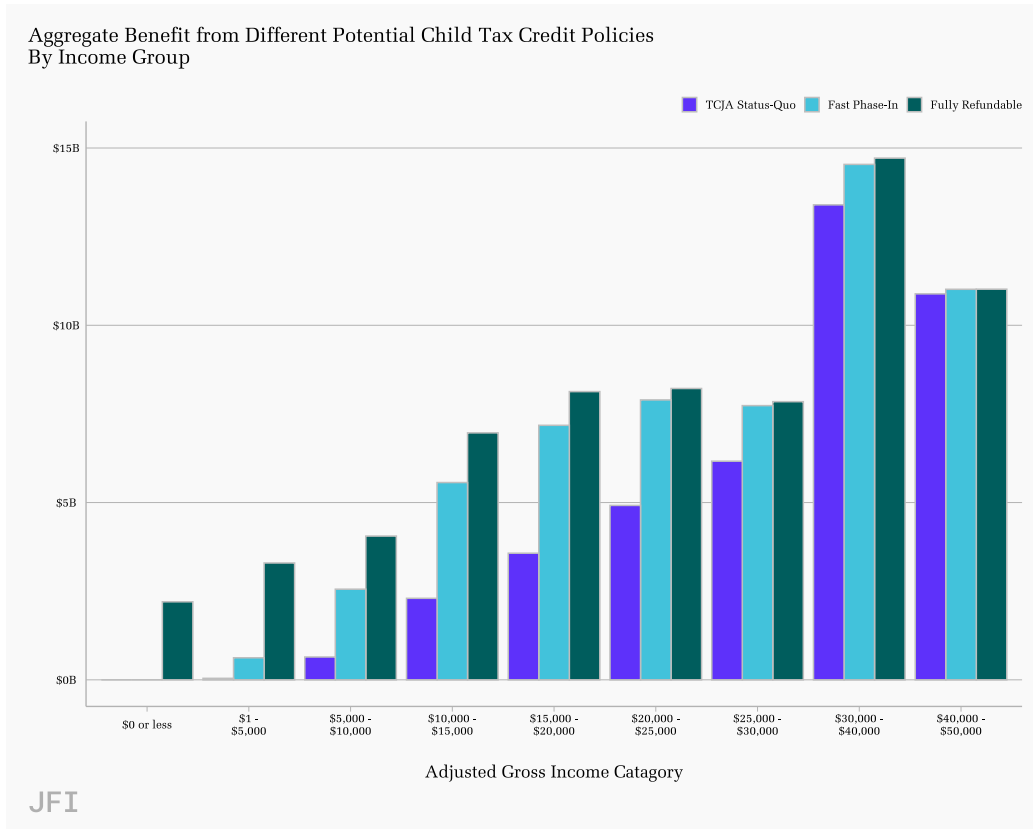


Figure 10: Distribution of Aggregate Benefits of TCJA CTC, Fully Refundable CTC, and CTC With A Faster Phase-In By Income Group

5 Discussion

5.1 Explanations for the Divergence Between Survey and Administrative Data

What explains the divergence between survey and administrative data estimates? There could be a significant take-up problem among families with no income. Before the COVID-related economic impact payments and the expanded CTC, a family without income would see no benefit to filing a tax return—nor was there a requirement to file. While there was a significant effort to inform families

about the credit, this may not have overcome years of conditioning tax benefits on working. Other parents may have heard about the credit, but did not file because they wanted to avoid contact with the IRS or because they find tax filing a confusing process. Most survey-based microsimulation assumes all eligible children receive the credit, so incomplete take-up could explain the difference between the survey-based estimates and my estimates based on IRS data.

Another possibility is that survey data is inaccurate, and households who made a small income misreport they did not earn any money during the year on a survey. This would suggest that relatively few families claimed the CTC with \$0 or less AGI because few families actually exist with \$0 or less AGI.

A third possibility is that children whose parent(s) have no income may be claimed by other people with earnings. This may reflect complicated family circumstances and confusion around claiming rules, or strategic maximization of refunds considering the impact of the EITC.¹⁴ Research on EITC related non-compliance found most incorrect EITC claims had some kind familial relationship with the child being claimed (Leibel, Lin and McCubbin 2020).

All three explanations likely play some role, but it is unclear how much explanatory power they have relative to one another. This is an extremely important topic for future research. For instance, if take-up among families with no income is as low as the discrepancy between survey and IRS data implies, it bolsters the case for more far-reaching administrative reforms to the CTC, such as administering a child allowance through the Social Security Administration (Hammond and Maag 2021).

¹⁴While parents with no earnings were eligible for the expanded CTC, a small amount of earnings would bring a much larger refund due to the EITC.

5.2 Policy Implications

Regardless of the underlying reasons for the discrepancy between survey data and IRS data on CTC claims, the low share of benefits currently reaching families with no income has important policy implications. First, the small share of benefits received by parents with no income provides important context for understanding the impact of the expanded CTC. While there is a fierce political debate over the merits of giving the credit to parents without any income, this group represents a small fraction of beneficiaries—96 percent of benefits went to families with positive income. The primary beneficiaries of the expanded CTC were low-income families—those with some positive AGI but less than \$50,000 received 62% of the total increase in benefits.

Second, the small share of benefits going to families with no income relative to those with low-incomes who do not receive the full \$2,000 CTC has important implications for future CTC expansions. Survey data analysis suggests that making the CTC fully refundable is essential for low-income families writ large because at least a third of them have virtually no income and would receive nothing from a CTC that is conditioned on earnings.¹⁵ IRS data shows otherwise. The small share of filers with no income in IRS data may be due to incomplete take-up. However, assuming 2021 incomes and filing rates remain constant, a CTC with a fast phase-in would deliver over 50% of the benefit of a fully refundable credit.

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¹⁵This comes from 7, counting all families that do not have enough earnings to qualify for the full CTC as low-income.

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A Additional Notes on Data Sources

A.1 Complications With Adjusted Gross Income Measure

Adjusted gross income bins do not perfectly measure the underlying concepts around income that are ideal for distributional analysis. For instance, adjusted gross income deducts educator expenses, student loan interest, alimony payments and retirement contributions from income. Some families \$0 or less adjusted gross income via declaring large losses on capital gains or business income. Popular Conceptions of children excluded from the CTC are low-income families whose parents have no earnings and little or no other cash income, not wealthy families with paper losses. Unfortunately, since the IRS data is aggregated rather than microdata, I cannot differentiate between these groups.¹⁶

A.2 Conceptual Differences With Survey-Based Microsimulation and IRS Measures of Returns By Income Group

The CPS-ASEC and the IRS data attempt to measure benefits for slightly different populations. The IRS data is a census of all payments, while the CPS-ASEC will miss payments to Americans living abroad, non-civilians, and other institutionalized housing arrangements outside its sampling frame. One factor not accounted for in my approach are the “safe harbor” provisions for families that received advanced CTC payments that were too large. Since advanced payments were based on 2020 or 2019 tax returns but paid during the last half of 2021, some families received larger payments than they were eligible for because their circumstances changed. Lower-income families that were overpaid because they could claim fewer children than their advanced payments were based on were allowed to keep a certain portion of the overpayment. It is unclear how much the safe harbor provision increased total CTC payments. However, the amount is likely fairly limited, because advanced payments only provided half of the total CTC parents were eligible for. For instance, if a family was provided advanced payments for two eligible children, but only ended up claiming one, they would not have been overpaid overall, as advanced payments were only 50 percent of their total payments.

¹⁶Examinations of IRS-PUF microdata from years before the expansion of the CTC could give insight into of the number of filers with \$0 or less adjusted gross income due to paper losses.

A.3 Complications with Administrative Measures of Take-Up

Measuring take-up of the CTC involves comparing the number of children who received the credit to the number of children eligible. While estimating the number of children eligible for the credit is not straightforward, the IRS does not publicize the number of children that received the expanded CTC, the most basic ingredient in measuring take-up. IRS SOI data only includes the number of tax returns claiming the CTC rather than the number of children. Turning the number of tax returns claiming the CTC into the number of children claiming the CTC requires an assumption about the number of children per return. I make this assumption (computed via microsimulation) for computing CTC benefits by income group, but in this context small errors in estimating the number of children per return makes little difference. However, for computing the total number of children who received the CTC, a tenth of a child difference in the estimate of the number of children per return would lead to an almost four million child swing of the total number of children who received the CTC, which makes this approach untenable.

A.4 Complications with Other Data Sources

The IRS SOI data includes both the number of filers claiming the expanded child tax credit and the aggregate amount of benefits they received. At first blush, this could be used to compute benefits of the expanded CTC by income group without relying on any microsimulation. However, the IRS data only shows end of year payments—it does not include monthly advanced payments. If some income groups disproportionately opt out of advanced payments or miss out on advanced payments and receive the entire CTC benefit as a lump sum at tax time, relying on this data would give an inaccurate picture of the total benefits of the expanded CTC. Using microsimulation to estimate the share of benefits of the expanded CTC by income group avoids these confounding factors. The other benefit of using microsimulation to estimate the average benefit by income group is that it ensures that we calculate the benefits of the expanded CTC, the TCJA CTC, and other potential reforms using the same source. There is no administrative IRS record of how much families would have been paid holding filing constant but using different tax rules.

There is also IRS SOI data on advanced payments by adjusted gross income level. Advanced

payments were made based on information in 2020 tax returns. If families did not file a 2020 tax return, or if it was still being processed by the IRS, a 2019 tax return was used. The fact that two years of tax return data are used to determine eligibility for advanced payments means that analyzing this data would downwardly bias the number of families with no income, as many fewer families have no income in multiple consecutive years than one year.