CTC and ACTC Participation Results and IRS-Census Match Methodology, Tax Year 2020

by

Ciyata Coleman
Internal Revenue Service

Charles Hokayem
U.S. Census Bureau

Sanghun (Eric) Kim
Internal Revenue Service

Ethan Krohn
Internal Revenue Service

Krishnan Patel
Internal Revenue Service

Dean Plueger
Internal Revenue Service

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Abstract

The Child Tax Credit (CTC) and Additional Child Tax Credit (ACTC) offer assistance to help ease the financial burden of families with children. This paper provides taxpayer and dollar participation estimates for the CTC and ACTC covering tax year 2020. The estimates derive from an approach that relies on linking the 2021 Current Population Survey Annual Social and Economic Supplement (CPS ASEC) to IRS administrative data. This approach, called the Exact Match, uses survey data to identify CTC/ACTC eligible taxpayers and IRS administrative data to indicate which eligible taxpayers claimed and received the credit. Overall in tax year 2020, eligible taxpayers participated in the CTC and ACTC program at a rate of 93 percent while dollar participation was 91 percent.

Keyword: Child Tax Credit, Additional Child Tax Credit, Participation

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[*] Any opinions and conclusions expressed herein are those of the authors and do not represent the views of the U.S. Census Bureau. The Census Bureau has ensured appropriate access and use of confidential data and has reviewed these results for disclosure avoidance protection (Project 6000463: CBDRB-FY24-CES004-019). The views expressed in this paper are those of the authors and do not necessarily represent the views of the IRS.

Summary of Child Tax Credit and Additional Child Tax Credit Participation for Tax Year 2020

Eligible taxpayers participated in the Child Tax Credit (CTC) and Additional Child Tax Credit (ACTC) program at a rate of 93 percent in tax year 2020. The dollar participation rate was 91 percent. [1]

Socioeconomic factors important for CTC/ACTC participation span a broad range of categories. Households headed by females participate at rates higher than households headed by males (93 percent and 88 percent, respectively). Married filers participate more than single filers (93 percent and 91 percent, respectively). Tax units with one qualifying dependent participate at the rate of 91 percent, lower than the national rate, while tax units with two or three qualifying dependents participate at rates of 94 percent and 96 percent, respectively, higher than the national rate.[2]

In tax year 2020, 2.4 million, or 7 percent, of eligible taxpayers did not participate.[3] Tax units with adjusted gross income less than $75,000 comprise 60 percent of eligible non-participants while tax units with modeled credit amounts less than $1,000, $2,000-$2,500, and $4,000-$4,500 together comprise 72 percent of eligible non-participants. Of the eligible non-participants, 39 percent filed a return.

Unclaimed CTC/ACTC dollars are estimated to be $9.3 billion which includes $3.7 billion in unclaimed dollars for non-filers, $2.2 billion in unclaimed dollars for filers who claimed no CTC/ACTC, and $3.4 billion in unclaimed dollars for under-claimants.[4]

The following section provides more information about the methodology used to derive the estimates.

Methodology Overview

The CTC/ACTC methodology provides two primary statistics to gauge CTC/ACTC participation: (1) the taxpayer participation rate and (2) the dollar participation rate. The taxpayer participation rate (a

[1] Definitions of taxpayer and dollar participation rates as well as methods used to derive participation rates can be found in the Methodology Section at the end of the paper. All estimates represent the combined Child Tax Credit and Additional Child Tax Credit conditional on eligibility. Since the estimates derive from a new methodology developed for CTC/ACTC participation, they are subject to revision as the methodology is refined, especially the estimates related to unclaimed dollars. Refer to the "Limitations of Analysis" subsection in the Methodology Section for more information.

[2] This paper uses the terms "taxpayers" and "tax units" interchangeably.

[3] For an alternative estimate of eligible non-claimants using a different approach relying only on IRS administrative data, refer to IRS Working Paper "Tax Year 2022 Child Tax Credit and Additional Child Tax Credit Benefits Gap Estimates for Filers Using IRS Administrative Data."

[4] Unclaimed dollars are subject to revision as the methodology is refined. Under-claiming can occur when the actual CTC/ACTC amount paid is less than the modeled CTC/ACTDC amount which can come from differing estimates of income and/or number of dependent children. For an alternative estimate of unclaimed CTC dollars relying only on IRS administrative data, refer to IRS Working Paper "Tax Year 2022 Child Tax Credit and Additional Child Tax Credit Benefits Gap Estimates for Filers Using IRS Administrative Data."

percentage) is the total number of taxpayers who received a CTC/ACTC payment divided by the total number of eligible taxpayers. The dollar participation rate (a percentage) is the total amount of eligible CTC/ACTC dollars paid out divided by the total CTC/ACTC dollars for which all taxpayers are eligible. Both participation rates are for the combined CTC and ACTC and represent participation conditional on eligibility.[5]

The Exact Match methodology for estimating the participation rates consists of linking individuals in the Current Population Survey Annual Social and Economic Supplement (CPS ASEC) to their tax return information from IRS administrative data. The CPS ASEC identifies the CTC/ACTC eligible taxpayers and eligible dollars, while the IRS administrative data and return information indicate which taxpayers claimed and received the credits and dollars paid. The following sections describe the CPS ASEC and IRS administrative data and detail the process of producing the participation rates.

Current Population Survey Annual Social and Economic Supplement

The CPS ASEC is a stratified random sample of 60,000-90,000 household addresses from the civilian, non-institutionalized population in the United States and is collected by the Census Bureau. It is a supplement to the monthly Current Population Survey, conducted in February-April of each year, that contains detailed information on demographic characteristics, annual earnings and incomes, employment, hours worked, and family structure. It also serves as the official source of U.S. income and poverty statistics. All income information in the CPS ASEC refers to the prior calendar year while demographic information is as of the survey interview date. Since the CPS ASEC does not collect tax information, the National Bureau of Economic Research's (NBER) TAXSIM program is used to model tax returns, including adjusted gross income, earned income, number of qualifying dependents, the Child Tax Credit, the Additional Child Tax Credit, and other important tax return fields.

IRS Administrative Data

The IRS provided the Census Bureau administrative tax data and return information. The return information covers all returns through cycle 26 of the year after returns are filed (e.g., tax year 2018 returns posted through cycle 26 of 2020), allowing for most audits to be completed. The key variables number of qualifying dependents for the CTC, ACTC, and Credit for Other Dependents (ODC), as well as claimed and allowed CTC and ODC amounts. Other important variables include wages, tips, and other

[5] Taxpayers who receive the credit but are not modeled eligible are not included in the participation rates.

compensation before any payroll deductions from all jobs in each tax year, adjusted gross income, investment income, and self-employment income.

Modeling CTC and ACTC Eligibility and Amount in the CPS ASEC

The first step of the participation methodology involves modeling tax units, CTC/ACTC eligibility, and CTC/ACTC credit amount using the CPS ASEC. The CPS ASEC does not collect any information on tax filing behavior, so we use the NBER TAXSIM microsimulation program to model the tax return and CTC/ACTC eligibility.[6] An important part of this modeling assigns individuals and dependents in the CPS ASEC to tax units using household, family, and relationship information and designating the primary filer within each tax unit. The NBER TAXSIM program takes up to 32 input variables, including filing status, number of tax unit members, number and ages of dependents, earnings, and other income items, and applies federal tax rules (including rules for CTC and ACTC) to simulate a federal tax return.[7] The simulated tax return contains adjusted gross income, filing status, tax liability, and, most importantly, CTC and ACTC eligibility and amount.

An adjustment must be made to exclude ODC from the estimated CTC amount must be made as TAXSIM includes ODC with the estimate of CTC.[8] We estimate the total number of dependents eligible for ODC in the tax unit based on the dependent's age and calculate a percentage of the TAXSIM estimated CTC amount that we believe to be ODC. This ODC percentage comes from dividing the total possible ODC by the sum of total possible ODC and total possible CTC after subtracting ACTC. We apply this percentage to the TAXSIM estimated CTC to determine the ODC amount with the remaining portion designated as the CTC amount.

Linking CPS ASEC to Administrative Tax Data

The Economic Reimbursable Surveys Division (ERD) at the Census Bureau processes the CPS ASEC and administrative tax data from IRS to add a Protected Identification Key (PIK) that allows the two data sources to be linked.[9] ERD assigns the PIK using a proprietary linkage software, the Person Identification

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[6] NBER TAXSIM is a collection of programs maintained by the National Bureau of Economic Research (NBER) that implements a model of federal and state income tax systems. Specifically, we use TAXSIM 32. More information about TAXSIM can be found at the NBER website < https://www.nber.org/research/data/taxsim>.

[7] Since the CPS ASEC collects data at the individual level, we aggregate the input variables to the tax unit level before running TAXSIM.

[8] The Credit for Other Dependents (ODC) provides a smaller credit of $500 to dependents that do not qualify for the CTC, typically due to the age and Social Security Number requirements of the CTC. It is combined with the CTC on the same line of the Form 1040 so is included in the CTC estimate produced by TAXSIM.

[9] The PIK acts as a unique identifier for each individual in the CPS ASEC and administrative tax data.

Validation System (PVS). PVS assigns the PIK in the administrative tax data using Social Security Number. Since the Social Security Number is not collected in the CPS ASEC, PVS assigns the PIK using a probabilistic matching model based on name, address, date of birth, and gender.[10] The PIK assignment rate for 2020 is 88.4 percent. To make the resulting linked CPS ASEC sample representative of the U.S. population, the weights of the linked individuals are adjusted, or re-weighted, to allow for PIK non-assignment (re-weighting is described later).

Adjustments to Original Modeled Eligibility

While the NBER TAXSIM model provides initial estimates of credit eligibility and amount based on the CPS ASEC, we further refine these initial estimates using IRS administrative data to account for tax behavior not predicted by the model and to correct for underreporting of income in the CPS ASEC. We implement the following series of non-income and income adjustments in a cumulative manner:

1. **Change filer from head to spouse adjustment:** The NBER TAXSIM model designates the head of a household as the primary filer, which may not always reflect actual filing behavior. This adjustment moves the modeled tax return information from the head to the spouse if the spouse filed but the head did not. If both the head and the spouse filed, the modeled return information is moved from the head to the spouse when the spouse claimed CTC/ACTC, and the head did not. If both the head and spouse filed, and both claimed CTC/ACTC, the modeled return information is moved from the head to the spouse when the spouse claimed the qualifying dependent and the head did not. If both filed and neither claimed CTC/ACTC, but a qualifying dependent appears on the spouse's return, the modeled return information is moved to the spouse.

2. **Qualifying dependent (QD) adjustments for cohabiting partners, multi-generational families, and all others:** This adjustment alters the number of qualifying dependents assigned to tax units and modeled filers by comparing the number of qualifying dependents reported on the survey to the number reported on the tax return. Important to this process is the creation of a "QD unit" within a household. A "QD unit" contains all individuals in the household who could share a qualifying dependent. We make the simplifying assumption that any dependent identified by the model as a qualifying dependent could be claimed by any relative, meaning a "QD unit"

[10] For more information about the PVS system refer to Wagner, Deborah, and Mary Layne. 2014. "The Person Identification Validation System (PVS): Applying the Center for Administrative Records Research and Applications' (CARRA) Record Linkage Software." CARRA Working Paper Series #2014-01. U.S. Census Bureau.

consists of all related individuals in the household. We also consider non-married partners (and their children) as part of the householder's "QD unit" (i.e., they are treated as relatives of the householder).

We adjust "QD units" based on the presence of "surplus" and "deficit" dependents. When a filer is modeled to have more qualifying dependents than they actually claimed on their return (i.e., more dependents in CPS ASEC than claimed on return), they have "surplus" children. When a filer claimed more dependents than modeled, they have "deficit" children. Non-filers are considered to not have claimed any dependents, so are classified as having a "surplus" if they are modeled to have any qualifying dependents. Adjustments are only made to units with at least one "surplus" qualifying dependent—units where, according to the CPS ASEC, there is at least one more qualifying dependent present than was actually claimed on the return. Surplus and deficit units are handled as follows based on filing, surplus, and deficit status:

- **Filer with a surplus:** The number of qualifying dependents is reduced to the number of qualifying dependents claimed on the return. The filer's eligibility and credit amount are re-estimated using TAXSIM based on the reduced number of qualifying children.
- **Non-filer with a surplus:** The number of qualifying dependents is reduced by the amount necessary to meet the needs of any deficit filers in the household (i.e., units in the household that claimed more qualifying children than modeled for them). In households comprised of both filers and non-filers with surplus dependents, deficits are first met by taking surplus dependents from filers followed by non-filers.

  As an example, if a household has a filer with 1 surplus dependent, a non-filer with 2 surplus dependents, and a filer with 1 deficit dependent, the dependent needed to make up the deficit comes from the filer with a surplus dependent (reducing the number of qualifying dependents for that filer by 1) rather than the non-filer. If the filer had a deficit of 2 dependents (rather than 1 deficit dependent), the filer with 1 surplus dependent still has that number reduced by 1, and the non-filer will have their number reduced by 1. If dependents change during this process, eligibility and credit amount are re-estimated using TAXSIM based on the new number of qualifying dependents.
- **Filer with a deficit:** The number of qualifying dependents is increased to the number of dependents claimed on the return. If the number of surplus dependents in the unit is less than the number of deficit children, deficits are met only to the extent a surplus allows.

As an example, if a household has a filer with 2 deficit dependents and another filer with only 1 surplus dependent, the deficit filer's number of qualifying dependents is increased by 1. If dependents change during this process, eligibility and credit amount are re-estimated using TAXSIM based on the new number of qualifying dependents.

The qualifying dependent adjustments described above apply to all "QD unit" groups which include cohabiting partners, multi-generational families, and all others.

3. **Income adjustment:** The final adjustment helps correct for potential income under-reporting in the CPS ASEC and uses the best measure of wages to estimate CTC/ACTC eligibility. All CPS ASEC wages are replaced with W-2 wages. Single individuals with no W-2 wages receive a wage value of 0 unless they filed a 1040 return, in which case they receive the amount of wage and salary income from the 1040 return. For married couples, 1040 wage and salary income is used only if W-2 wages are not found for either spouse. We use any modified wages to adjust modeled earnings and modeled adjusted gross income.
We also perform an additional income modification for investment income. If the investment income on the 1040 return exceeds the modeled investment income, the modeled income is replaced with the 1040 investment amount and modeled adjusted gross income is recomputed to account for the higher investment amount. Similarly, if the non-wage non-investment portion of adjusted gross income is higher on the 1040 return than the corresponding portion of modeled adjusted gross income, the modeled adjusted gross income is recomputed to account for the higher 1040 amount. Following these income adjustments, eligibility and credit amount are re-estimated using TAXSIM with the new wage and income amounts.

Weighting Procedure

The CPS ASEC includes supplement weights designed to sum to the total civilian, non-institutionalized population in the United States. Individuals who are not assigned a PIK are removed from the analysis.[11] Removing these individuals from the analysis potentially causes the sample to no longer be representative, and the supplement weights will not sum to the total population. To address these concerns, we assume PIK non-assignment is missing at random conditional on race, ethnicity, age, and marital status and inflate the supplement weights for the individuals that are assigned a PIK. The factors used to inflate the supplement weight come from dividing the sample into groups defined by race,

[11] Refer to earlier section "Linking CPS ASEC to Administrative Tax Data" for a description of the PIK assignment process.

ethnicity, age, and marital status. After calculating factors for each group, we apply the factor to each supplement weight, creating a new set of adjusted weights used throughout the analysis.

Limitations of Analysis and Estimates

Certain limitations should be considered when interpreting the CTC/ACTC estimates, including: error associated with modeling tax units, number of qualifying dependents, and credit eligibility and amount.

Modeling tax units and qualifying dependents subject to error: Modeling tax units and qualifying dependents could be subject to error due to differences in the reference period of demographic information collected in the CPS ASEC and tax returns. CPS ASEC demographic information used to form tax units is collected in February-April of each year while this information is reported on a tax return as of December 31 of the prior year. This misalignment in reference periods can lead to differences in the number and composition of tax units identified in the CPS ASEC when compared to the tax return. This difference is especially salient for the number and age of qualifying dependents in the tax unit, an important component of CTC and ACTC. In addition, the CPS ASEC does not collect respondent or dependent Social Security Number. As a result, verifying a qualifying dependent's Social Security Number as required for CTC/ACTC eligibility is difficult in the survey.

Modeling credit eligibility and amount subject to error: Modeling credit eligibility and amount could also be subject to error stemming from income differences between the survey and tax return, not accounting for other nonrefundable credits, and disentangling the Credit for Other Dependents (ODC) from CTC. Differences in earnings and income reported in the survey and the tax return could affect modeled eligibility determination. We attempt to mitigate these differences through an income adjustment by using W-2 wages in place of CPS ASEC wages as well as replacing modeled adjusted gross income with adjusted gross income from the tax return when higher than modeled the amount. Modeled credit eligibility and amount does not account for other nonrefundable credits that play a role in determining CTC/ACTC such as Credit for Alternative Motor Vehicles, Residential Energy Credit, and Credit for Child and Dependent Care Expenses.[12] These other nonrefundable credits are not available in the CPS ASEC or modeled in TAXSIM, so they are assumed zero in this analysis. Not accounting for these

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[12] A complete list of other nonrefundable tax credits affecting CTC eligibility and amount can be found in IRS Publication 972 for 2020, Child Tax Credit and Credit for Other Dependents.

credits could upwardly bias eligibility and the amount of CTC/ACTC dollars eligible to be received. Since the sum of the CTC and ODC credits are modeled together, we must divide this sum into a portion for CTC and a portion for ODC to isolate the modeled CTC amount. The accuracy of modeled CTC therefore relies on accurately isolating ODC.