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Effects of the Expanded Child Tax Credit on Employment Outcomes: Evidence from Real-World Data from April to December 2021

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ABSTRACT

Studies have established that the expanded Child Tax Credit (CTC), which provided monthly cash payments to most U.S. families with children from July to December 2021, substantially reduced poverty and food hardship. Other studies posit, however, that the CTC payments may generate negative employment effects that could offset its potential poverty-reduction effects. Scholars have simulated employment scenarios assuming various labor supply elasticities, but less work has empirically assessed how the monthly payments affected employment outcomes using real-world data. To evaluate employment effects, we apply a series of difference-in-differences analyses using data from the monthly Current Population Survey and the Census Pulse, both from April through December 2021. Across both samples and several model specifications, we find very small, inconsistently signed, and statistically insignificant impacts of the CTC both on employment in the prior week and on active participation in the labor force among adults living in households with children. Further, labor supply responses to the policy change do not differ for households for whom the CTC's expansion eliminated a previous work incentive. Thus, our analyses of real-world data suggest that the expanded CTC did not have negative short-term employment effects that offset its documented reductions in poverty and hardship.

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INTRODUCTION

From July through December 2021, most families with children in the United States (U.S.) received monthly cash payments of $300 per child under age six and $250 per child between the ages of 6 and 17. The first monthly payment was distributed to families of 59.3 million children in July, while subsequent payments reached more than 61 million children (U.S. Department of Treasury, 2021). Early assessments of the expanded CTC payments suggest they had increased low-income families' spending on food items (Perez-Lopez, 2021), had strongly reduced child poverty rates (Parolin, Collyer, Curran, & Wimer, 2021), and had strongly reduced food insufficiency (Parolin, Ananat, Collyer, Curran, & Wimer, 2021). Recent empirical research has had less to say, however, on the expanded CTC's effects on employment outcomes (one exception being Roll, Hamilton, & Chun, 2021).

Economic theory predicts competing effects of the expanded CTC on parental labor force participation and employment. On one hand, the elimination of the phase-in portion of the previous CTC raises incomes while lowering the return to work, which could reduce parental labor force participation and employment. As we discuss below, most simulations of the CTC's effects thus assume some negative employment effects, though to varying magnitudes (Bastian, 2022; Corinth, Stadnicki, Meyer, & Wu, 2021; Goldin, Maag, & Michelmore, 2021; National Academies of Sciences, Engineering, and Medicine, 2019). On the other hand, eliminating the phase-in, and therefore providing cash to families that are not working, may provide credit-constrained parents with resources to address barriers to employment, such as by allowing them to secure childcare or get auto repairs, which could increase labor force participation and employment. Rachidi (2021), for example, finds that five percent of monthly CTC recipients report that the extra income helped them work more, compared to an equivalent share (5 percent) who say that the CTC helped them

work less. Similarly, data from the Census Household Pulse Survey suggest that more than 10 percent of CTC recipients have used the funds for childcare expenses (Roll, Hamilton, & Chun, 2021). Moreover, increased aggregate demand as a result of higher incomes, particularly among populations such as low-income families with children that have a high marginal propensity to consume, may have positive macroeconomic effects that contribute to higher aggregate employment (Fisher, Johnson, Smeeding, & Thompson, 2020).

In recent simulation work, scholars have modeled the potential employment effects of the fully-refundable CTC and, in doing so, have reached varying conclusions. The National Academies of Sciences, Engineering, and Medicine (2019) report on cutting child poverty in half suggests that a child allowance similar to the reformed CTC might reduce employment by 150,000 workers. Focusing on the parameters of the version of the monthly CTC passed into law, Goldin, Maag, and Michelmore (2021) likewise estimate small employment responses. Brill et al. (2021) estimate a decline of 296,000 full-time equivalent jobs. Bastian (2022) estimates that 413,000 adults would stop working. Corinth, Stadnicki, Meyer, and Wu (2021), in contrast, estimate that the expanded CTC would lead 1.5 million working parents (2.6 percent of all working parents) to exit the labor force. The differences in the simulations are driven by different assessments regarding the proper size and the types of employment elasticities applied in the models.

This study diverges from the simulation approach and the related debate over the assumed size of employment elasticities; we instead build on earlier work by empirically assessing the employment effects of the expanded CTC using available data pre- and post-expansion. Specifically, we apply a series of difference-in-differences analyses using data from the monthly Current Population Survey files from April 2021 through December 2021, and the Census Household Pulse Survey microdata collected from April 14, 2021 through December 13, 2021. In

both datasets, we leverage variation in policy eligibility between households with children and those without, as well as variation in CTC payment amount received by households based on the ages of children, the number of children, and pre-reform income levels.

Across both samples and several model specifications, we find very small, statistically insignificant, and inconsistently signed impacts of the CTC on employment in the prior week and on being active in the labor force. Findings are similar when evaluating heterogeneous effects across income levels. Of note, effects for families who earned less than $25,000 prior to the reform, and who therefore face the largest decline in the return to work due to the elimination of the CTC phase-in, are indistinguishable from the effects for higher-income families, in contrast to the predictions of simulation work. The short-term consequences of the CTC for employment, estimated using real-world outcomes, are not consistent with simulations that suggest that the CTC's long-run employment effects will meaningfully offset its observed reductions in poverty and hardship (Corinth et al., 2021). They are, instead, consistent with other real-world results showing declines in poverty and food insufficiency in families with children as a result of the CTC expansion.

We acknowledge that long-run employment effects, should the program be made permanent, could be different from those observed in 2021. However, theory suggests that the temporary nature of the 2021 program, along with other exceptional features of the 2021 labor landscape, arguably make the effects of the 2021 expansion a *lower* bound for any negative labor supply effects of a permanent expansion.

POLICY CONTEXT

Prior to the expanded CTC, tax filers could receive a maximum CTC of $2,000 per child per year, but many children did not receive the full refundable amount.[1] The CTC credit phased in at a rate of 15 cents per dollar of earnings, providing an effective wage subsidy but denying benefits to those with low or no earnings. As a result, one in three children did not receive the full benefit value because their families did not earn enough income to qualify. Children with single parents, those in rural areas, Black and Latino children, and those in larger families were disproportionately ineligible for the full credit (Collyer, Harris, & Wimer, 2019; Curran & Collyer, 2020).

Following parameters similar to the American Family Act (a bill first introduced in both the Senate and House of Representatives in 2017 and reintroduced in 2019), the American Rescue Plan (ARP) temporarily transformed the CTC into a nearly-universal child allowance for 2021.[2] Specifically, the ARP included three fundamental changes to the CTC. First, it made the CTC available to almost all children—including those previously excluded due to their families' low income—by removing the earnings requirement and making the credit fully refundable. Second, it raised the maximum annual credit amount to $3,000 for children ages 6–17 and $3,600 for children under age six. Third, beginning mid-July 2021, the ARP delivered the credit in monthly installments of up to $250 per older child or up to $300 per child under six years of age, for a period of six months.[3]

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[1] For additional information on the history of the Child Tax Credit, see Crandall-Hollick (2021), Crandall-Hollick (2018), and Garfinkel et al. (2016).

[2] The expansion to the CTC in the ARP mirrors the proposed reforms in the American Family Act (AFA) with one exception: in the AFA, the credit would begin to phase out for heads of household with earnings above $120,000 or and joint filers with Adjusted Gross Incomes (AGI) over $180,000. In the ARP, the credit began to phase out for families with AGIs above $112,500 or $150,000 per year, depending on filing status, but it only phased out until matching the credit values that a family would receive under prior law. This alteration was made because the Biden administration committed to not raising taxes for those with incomes below $400,000 per year.

[3] Because the payments began halfway through the year, families received half of the full amount of their credit in 2021 and the remainder after filing their 2021 taxes in 2022.

Early research suggests that the expanded CTC generated large reductions in child poverty (Parolin, Collyer, et al., 2021), reduced food insufficiency among households with children (Parolin, Ananat, et al., 2021), increased spending on childcare (Roll, Hamilton, & Chun, 2021), and helped as many working parents "work more" as to "work less" (Rachidi, 2021). Though economic theory largely predicts, and has often demonstrated, that an unconditional cash transfer can lead to employment declines, recent studies evaluating similar child benefit programs in Canada—the Canadian Universal Child Care Benefit (UCCB) and the Canada Child Benefit (CCB)—found no evidence of a labor supply response (Baker, Messacar, & Stabile, 2021).

For that reason, recent research simulating the effects both of a permanent child allowance (National Academies of Sciences, Engineering, and Medicine, 2019) and of a permanent version of the 2021 CTC expansion (Corinth et al., 2021) has modeled the income elasticity of parent earnings with respect to the transfer as zero. However, differences in assumptions about the price elasticity of parent earnings—relevant because of the expansion's erasure of the phase-in range of the credit, which eliminated a wage subsidy for the lowest-earning parents—led to different predictions about the effects of this expansion on parent employment, with Corinth et al. (2021) suggesting employment declines that range from 150,000 adults to 1.5 million adults.

Rather than projecting future employment losses, this study investigates real-world data to assess whether the temporary CTC expansion had a plausibly causal effect on parents' labor market engagement during its installments of six monthly payments in 2021. While these estimates reflect the effects of a temporary, rather than permanent, policy change, the effects of a temporary cut in the return to work on labor supply are likely to provide a lower bound for any negative effects of a permanent change. Holding the income elasticity of parent labor supply at zero, as is now conventional in the literature, means that only the compensated price elasticity is at play.

Compensated intertemporal labor supply elasticities will be larger in response to temporary wage changes than in response to permanent wage changes due to incentives for re-timing (see, e.g., Biddle, 1988). That is, the policy provides a time-limited opportunity for a non-work spell at a lower price than usual, which will cause a much higher number of parents to re-time a desired non-work spell toward the low-price period than would take time out of the labor force in any given period if the price were permanently lowered. In addition, there are several reasons parents would have been more likely to substitute away from employment during 2021 than they might be in more typical times. First, the threat of COVID temporarily increased the cost to many Americans of working, particularly in the public-facing roles most often available to the low-wage workers most affected by the elimination of the phase-in. Second, child care and school continued to be unpredictable in the second half of 2021, again making work temporarily less feasible and attractive for parents. Third, continuing worker shortages over the period implied parents would be able to find jobs in 2022 if they took time off in 2021, temporarily lowering the opportunity cost of delayed job matching. All of these factors increased parents' incentives to re-time non-work spells toward late 2021 in response to the temporarily lower cost of such spells. Even if only some parents perceived the change in CTC as temporary, while others perceived it as permanent, the aggregate decline in employment should still provide a lower bound for the aggregate decline under an announced permanent CTC change. Thus, empirical estimates of the effects of the temporarily expanded 2021 CTC on parental employment are likely to provide a lower bound for any parental employment effects of a permanently expanded CTC.

DATA AND METHODS

Data

This study uses data from the Current Population Survey (CPS) and the Census Household Pulse Survey (Pulse). The CPS is a nationally representative monthly household survey conducted jointly by the U.S. Census Bureau and the Bureau of Labor Statistics. As the primary source of employment statistics for the US population, the CPS gathers data on labor force participation and demographics in its basic monthly survey, as well as data on other dimensions of social and economic well-being through various topic-oriented supplements. We use data from April 2021 through December 2021 basic monthly surveys. We exclude the month of July, given that we cannot distinguish pre-treatment versus post-treatment responses within July.

We supplement the CPS data with analyses from the Census Household Pulse survey. The Pulse was introduced in April 2020 by the U.S. Census Bureau to obtain up-to-date and nationally representative information on the social and economic wellbeing of households across the U.S. Participants are randomly selected to participate in the survey, which has been used to track trends in material hardship, subjective well-being, and other social and economic indicators throughout the COVID-19 pandemic (Bauer et al., 2018; Bitler, Hoynes, & Schanzenbach, 2020; Cai, Woolhandler, Himmelstein, & Gaffney, 2021; Morales, Morales, & Beltran, 2020; Schanzenbach & Pitts, 2020; Twenge & Joiner, 2020; Ziliak, 2021). For this study, we use data collected from April 14, 2021 through December 13, 2021 (Waves 28–40). The first payment of the expanded CTC was delivered to recipients on July 15, 2021, which falls prior to the beginning of Wave 34 of the Pulse (Wave 34 spans July 21 to August 2, 2021).

In Wave 34 of the Pulse, the U.S. Census Bureau altered the position of its employment question within the survey, leading to different levels of item non-response for employment status relative to prior waves. Given that the change in item non-response affects both our treatment and control groups, it should not bias our findings. In particular, even if the change were to affect

families with children differently from childless families, one of our analytical strategies, discussed below, identifies differences in the magnitude of the change in CTC benefit due to the expansion *among* families with children. These differences are idiosyncratic functions of the age and number of children and family income, and do not correspond neatly to otherwise salient differences between families that might drive differences in effects of the survey change. Thus, our robust approach of using multiple difference-in-differences specifications allows us to produce credible estimates of the CTC's effects on employment within the Pulse, along with parallel estimates using the CPS, which was unaffected by any such change.

Sample

We limit our primary samples to adults between the ages of 18–65 years old. Our pooled CPS monthly sample includes 504,364 adults. For our pooled Pulse data, we exclude adults residing in households that had imputed values for the number of children in the household, as errors in the imputed values could bias our estimates. Our final Pulse primary analytical sample includes 478,026 adults. Descriptive statistics for both samples are shown in Table 1.

Measures

Outcomes

In the CPS, we investigate the impact of the CTC expansion on the extensive margin of the supply of labor using both employment status, as measured by an indicator variable for employment at the time of the interview, and whether adults were members of the labor force in the week prior to their CPS interview. The Pulse does not collect data on labor force participation, limiting our analyses of the Pulse sample to only effects on employment status.

Receipt of the CTC

The Pulse includes its own question about whether anyone in the household received a CTC payment under the American Rescue Plan (U.S. Department of Treasury, 2021), which we use to estimate treatment-on-the-treated (TOT) effects in addition to intent-to-treat (ITT) effects based on the presence of children. By contrast, the monthly CPS does not gather information on CTC receipt. We therefore code a household as eligible for receiving CTC payments in the CPS if they had at least one child present in the household, and we estimate only ITT effects in the CPS.

Income Subgroups

We also conduct subgroup analyses by pre-expansion household income. In the CPS, we define subgroups using a categorical income variable that includes "money from jobs, net income from business, farm or rent, pensions, dividends, interest, social security payments, and any other money income received" among family members in the prior year. In the Pulse, we use a similar categorical income variable that includes "pre-tax income" from 2019 (waves 28 to 33) or 2020 (waves 34 onward).

Analytical Strategy

Our analytical strategy follows that of Parolin, Ananat, Collyer, Curran, and Wimer (2021). To assess the effect of the CTC on the labor market outcomes we employ difference-in-differences models using the following equation:

$$y_{it} = \beta_1 PostCTC_t + \beta_2 Treatment_i + \beta_3 (PostCTC * Treatment)_{it} + \beta_4 X_i + +\varepsilon_{it} \quad (1)$$

where y_{it} is one of our two outcomes of interest (employment status; labor force participation). *PostCTC* is a binary indicator of whether the time of the survey was after July 15th, 2021, the date when the expanded CTC was first administered. *X* is a vector of household head characteristics—age, sex, and education status—and both state and month fixed effects.

We specify our treatment variable, *Treatment*, in three separate ways. In our first specification, we operationalize a binary treatment indicator that is equal to one if a household had children and set to zero if no child was present in the household. In our second specification, we estimate models using a continuous measure of treatment intensity to capture the fact that the effects of the CTC are likely to vary by the age of children (as families with children under age six receive larger monthly benefit values), the number of children in the home, and the relative value of the new CTC benefits compared to what the household likely received from the CTC prior to the reform. Because we do not have information on pre-reform CTC receipt, we use data from the 2019 U.S. Current Population Survey Annual Social and Economic Supplement (CPS ASEC) to estimate the mean pre- and post-reform benefit values for bins defined by the number of adults in the household (ranging from 1 to 10), the number of children in the household (ranging from 0 to 10), and eight categorical pre-tax income bins (from under $25,000 annually scaling up to more than $200,000 per year). We compute the mean pre-reform refundable CTC benefits as observed for each family unit in the CPS ASEC. We then simulate the *additional* post-reform benefits that each family is eligible for using detailed policy rules from the CTC reform as specified in the 2021 American Rescue Plan. We subtract the pre-reform benefit value from the post-reform benefit value to create a "net benefit" indicator for each family unit.[4] Finally, we calculate the weighted mean of the net benefit value for each of the bins defined above. We then import this value into our 2021 Pulse and monthly CPS data, matching on the number of adults, number of children, and total family income of respondents. Figure 1 displays the mean net CTC benefits by income bin and family size. In our third specification, we calculate the change in income from work plus

[4] In a sensitivity test, we also evaluate the results when adjusting the benefits for family size using the modified OECD equivalent scale. The OECD scale begins with a value of 1 for a single adult, then adds 0.5 for each child in the home and 0.3 for each additional adult in the home. The results are not meaningfully different from our primary findings.

expanded CTC, relative to 2019 income from work plus prior CTC benefit, in order to reflect the change in the return to work faced by a household.

In each model, β_3 is our primary coefficient of interest, as it identifies, when using the binary treatment indicator, whether adults in households with children were more or less likely to be engaged in the labor market relative to adults in childless households after the introduction of the CTC changes. When using the continuous dollar treatment, it represents the effect of eligibility for an additional $100 per month in increased net benefits on labor market engagement. When using the third specification, it represents the effect of a given percent change in the return to work on labor market engagement.

Because we are unable to identify whether households actually received CTC payments in the CPS, β_3 in Equation (1) provides the intent-to-treat effect—the effect of the treatment on the full treatment group, regardless of actual CTC receipt—of the CTC expansion for this sample. In addition to estimating Equation (1) for the Pulse sample, we also utilize the information on CTC receipt in the survey to provide estimates of the treatment effect on the treated, or the local average treatment effect. To do so, we estimate two-stage least squares models (2SLS) using the treatment group identifier as an instrumental variable and observed receipt of the treatment as the endogenous variable. When applying our binary treatment measure, observed receipt of the treatment reflects whether a family in the Pulse reports having received the monthly CTC payment(s). When applying our continuous treatment indicator, the observed treatment in the 2SLS model is a family's projected net benefit increase from the CTC interacted with their report of receipt. In other words, because previous and current size of the CTC benefit received are not directly measured in the Pulse, we apply our projected value of the net CTC benefit increase based on the family's income, number of children, and number of adults (as defined above) as the

observed treatment; however, we convert the projected benefit value to zero for families reporting that they did not receive the CTC payment.

In addition to our main analytical specification, we also estimate effects separately for families in different pre-period annual income bins, from less than $25,000 to over $200,000 in total family income. These subgroup estimates allow us to test the fundamental prediction of prior simulation work, namely that parental labor force participation and employment will decline (Corinth et al., 2021). That work posits that the decline in the return to employment due to the elimination of the phase-in will cause some parents to drop out of the labor force. Because the percentage drop in the return to work is larger the lower the earnings of the parent, their simulations predict that the lowest-income families will exhibit the largest reduction in employment after expansion of the CTC. Evidence inconsistent with the lowest-income families responding differently from higher-income families thus represents *prima facie* evidence against the validity of the assumptions driving recent simulations' predictions that labor force decline will offset anti-poverty and anti-material hardship effects of the CTC expansion.

FINDINGS

Descriptive Findings

Figure 2 shows the trend in employment and labor force participation from April 2021 to December 2021 using the monthly CPS. This window is in the middle of the COVID-19 pandemic and begins after the initial macro-level drop in employment and participation. Each point represents the weighted average employment rate or the labor force participation rate among respondents between the age of 18 and 65. These results are split by whether the respondent reported at least one child in the household.

Figure 2 highlights the baseline difference in labor market engagement between adults in households with and without children, wherein adults in childless households tended to have lower levels of employment and labor force participation throughout this sample window. Employment and labor force participation increased among adults in both household types from April through June 2021. For adults in families with children, employment continued to increase even after the first CTC payment in July 2021. Labor force participation among adults in families with children in December 2021 was higher than its pre-CTC value, in contrast to the labor force participation rate of adults in childless families.

Patterns are similar when evaluating differences in labor market engagement by household income (Figure 3). Across three income bins from $0 to $34,999, $35,000 to $74,999, and $75,000 or more, adults in families with children were consistently more likely to be employed and participate in the labor market compared to adults in childless households. Nevertheless, in all three income bins, employment and labor force participation rates among adults in households with children trended similarly to rates among adults in childless households from April to July.

Estimation Results

Table 2 presents the results from difference-in-differences estimates on employment status and labor force participation using data from the CPS sample. Columns 1 and 2 provide estimates from models using our binary treatment measure, while Columns 3 and 4 provide estimates from our continuous treatment measure as discussed above. Our results suggest, in short, that the CTC expansion had no significant impact on employment outcomes.

Specifically, estimated effects using the binary model of treatment show that relative to adults in childless households, adults in households with children had a statistically insignificant 0.2 percentage point drop in employment (s.e.=0.005) and 0.1 percentage point increase in labor

force participation (s.e.=0.005) after CTC expansion. Using the continuous treatment measure—capturing variation based on pre-tax income and household size—we find that an additional $100 in monthly CTC led to a statistically insignificant 0.1 percentage point increase in employment (s.e.=0.1 percentage points) and a statistically insignificant 0.2 percentage point increase in labor force participation (s.e.=0.1 percentage point).

Table 3 displays the estimated effect of the CTC on being employed using data from the Pulse. Again, we present estimated effects using our binary and continuous treatment measures. Due to data limitations in the Pulse (which does not ask about labor force participation), Table 2's estimates are restricted to employment effects. Our analyses presented in Columns 1 and 3 estimate the effect of the policy intending to treat (ITT) all households with children, regardless of whether they report receiving the benefit. Columns 2 and 4 present the 2SLS estimates of the treatment effect on the treated (TOT), using the intent-to-treat as an instrument for the actual treatment. Similar to analyses using the CPS data, we find that CTC expansion had no statistically significant impacts on being employed: the estimated increase in employment ranges from 0.1 percentage points to 0.5 percentage points, with standard errors ranging from 0.2 to 0.9 percentage points.

Figures 4 and 5 visualize the effect of the CTC on employment outcomes across the income distribution using the CPS and Pulse data respectively. Each point in Figures 3 and 4 represents the coefficient from the interaction terms for our binary treatment (black circle) and continuous treatment (gray triangle) when subsetting the sample to only include households with total incomes under $25,000, then between $25,000 to $35,000, $35,000 to $50,000, $50,000 to $100,000, and $100,000 to $200,000.

Figure 4 and Figure 5 highlight the insignificant and inconsistently signed relationship between the CTC expansion and employment across the income distribution, using both data sets

and both the binary and continuous treatment measures. In the CPS, where we can also observe labor force participation, we also find insignificant and inconsistently signed relationships between the CTC expansion and engagement in the labor force at nearly every point in the income distribution. The one exception is the binary treatment for adults with children in the $50,000 to $100,000 bin (-0.1 percentage point decline), but our continuous treatment estimate for this income group is not statistically significant.

Notably, we find no significant differences between the effects of expansion on the lowest income groups and higher income groups, nor do we find any evidence of a gradient in effects by income—both of which would be predicted by the elasticity assumptions that drive Corinth et al.'s (2021) predictions of labor force decline. In fact, in some cases, estimates for the lowest income groups are more positive than those for other groups.

In Table 4, we estimate models using the change in the return to work rather than the change in income. Due to the fully refundable status of the CTC expansion, the relative return to work is reduced in comparison to the CTC payments from the Tax Cuts and Jobs Act. Table 5 defines treatment as the percent change in the net effective wage (difference between new earnings plus work-dependent transfers and old earnings plus work-dependent transfers divided by old income plus work-dependent transfers) under the expanded CTC. Again, the results are statistically insignificant and inconsistently signed.

Robustness Checks

In Table 5, we present alternative models using March 2021, the month when the policy was introduced (but before CTC payments were distributed), as our treatment timing. Similar to our actual estimates, we find small and insignificant effects that suggest that parents did not respond to the announcement of the policy by reducing their labor supply. In Table 6, we replicate

our primary findings on 2020 CPS data to assess the possibility of seasonality affecting our findings. The results suggest that this is not the case.

Callaway and Sant'Anna Group-Time Treatment

Recent work has cast doubt on both the validity and robustness of the two-way fixed effect estimator when more than two treatment groups and periods are included in analytical models, treatment timing varies, and treatment effect is heterogeneous (Borusyak, Jaravel & Spiess, 2021; Callaway & Sant'Anna 2021; Goodman-Bacon, 2021; Sun & Abraham, 2021). While the use of the CTC expansion as a treatment does not fall within these critiques, the two-way fixed effects estimator still reports a weighted average treatment on the treated estimate across treatment groups because treatment size varies across households. Fortunately, however, treatment size varies on observable characteristics—the number and age of children in the household.

A further complication in our analytic design is the continuous nature of CTC payments. The traditional difference-in-differences framework operates on a binary treatment, identifying the treatment and control groups and clean comparisons. When using a continuous treatment, the comparison groups become more difficult to identify (Callaway, Goodman-Bacon, & Sant'Anna, 2021). For continuous treatments, both the level and slopes of the dose-response relationship are required to gain a complete understanding of the treatment effects of a group-varying continuous treatment.

We address these issues by leveraging the Callaway and Sant'Anna (2021) estimator at both the aggregate and group treatment levels. We first treat the introduction of the CTC as a simultaneous binary treatment among all eligible households. We use the binary treatment coding to create an event study design, presented in Figure 6, exploring how the CTC expansion's effect

changed in the months following its adoption. This also allows us to estimate an aggregate effect across all eligible individuals. The binary treatment coding is expanded in three ways. First, we create separate household groups by household composition (i.e., the number of children and their ages). Second, we create $25 bins of additional monthly CTC payments and present those treatment bins which are represented by at least 1% of the sample. Third, we create 1% bins of the change in the relative wage ranging from no change in the control group to a reduction of 9% or more. Repeating the analysis at the treatment-group level in Tables 7, 8, and 9 allows us to estimate a different ATT(d/x) for CTC dosage d in treatment group x. This estimation does not allow us to make the case that each ATT(d/x) can be linked as a single dosage response curve, but rather that each is a different point on each group x's dosage response curve.

Results from our analysis using the Callaway and Sant'Anna (2021) estimator reveal no evidence of an effect of the CTC expansion on employment or labor force participation. These results are in line with results from our main analytical specification. When exploring the CTC expansion by groups, we find no evidence of significant deviation from the aggregate result. The CTC expansion did not appear to affect parents' employment or labor force participation regardless of household composition.

DISCUSSION AND CONCLUSION

The temporary expansion of the Child Tax Credit in July 2021 into a more generous and inclusive monthly payment represented a large deviation from the direction of the U.S. welfare state throughout the past three decades. Recent studies have shown that the CTC expansion had reduced poverty rates (Parolin, Collyer, et al., 2021) and food insufficiency (Parolin, Ananat, et al., 2021) among households with children. Some researchers, however, suggest that the expansion

may generate negative employment effects. While recent simulation research has reached varying conclusions—with some scholars finding negligible negative effects and others significant reductions in labor force participation—little research to date has empirically evaluated the impact of the CTC expansion on employment outcomes using real-world data.

This study uses two nationally-representative datasets covering the six months of payments (April to December 2021) to assess the effect of the expanded CTC on employment outcomes among adults with children. To identify policy effects, we implemented a series of difference-in-differences models leveraging the variation in policy eligibility and the structure of CTC payment amounts. In addition to our main analytical specification, we also estimated effects separately for families in different pre-period annual income bins, from less than $25,000 to $100,000-$200,000 in total pre-period family income.

Our analyses reveal that the CTC expansion had no meaningful impact on employment and labor force participation after six months of benefit distribution. Among adults in the CPS sample, we find statistically insignificant differences in employment (with inconsistent signs) and statistically insignificant increases in labor force participation. Using the Pulse data, in which we estimate treatment effects on the treated, we find a statistically insignificant increase in employment among adults in eligible households in the six months following the CTC expansion. A variety of robustness checks also consistently show insignificant effects on employment and labor force participation.

Results from analyses exploring heterogeneity across income groups also reveal that the CTC expansion had no significant effect on employment and labor force participation for the lowest-income groups, which benefited most from the CTC expansion. Of note, we find no significant differences in policy effects between the lowest income groups and high-income

groups, or any evidence of a gradient in effects by income. Evidence inconsistent with the lowest-income families responding differently from higher-income families represents *prima facie* evidence against the validity of the assumptions driving recent simulations' prediction that labor force decline will offset anti-poverty and anti-material hardship effects of the CTC expansion (Corinth et al., 2021). Moreover, evidence from a temporary change in the cost of non-employment, given the scholarly consensus that the income effect of the CTC on parent employment is zero, should provide a lower bound for the effect of a permanent expansion of the CTC on employment. Evidence that even the temporary wage cut in the 2021 CTC expansion did not reduce parent employment thus strongly suggests that a permanent expansion would not meaningfully reduce parent employment.

We conclude that real-world data on employment during the CTC expansion do not support claims that the elimination of the phase-in portion of the CTC discouraged work among parents in any meaningful way, much less that such effects are large enough to offset decreases in poverty and material hardship driven by the expansion's increased generosity and inclusivity. Our results are, instead, consistent with other real-world analyses of the expansion's effects, which show observed declines in child poverty (Parolin, Collyer, et al., 2021) and strongly reduced food insufficiency (Parolin, Ananat, et al., 2021). Our results suggest that the mechanism through which these reductions occurred is that the increase in income that was both intended and accomplished through the expansion, combined with a lack of unintended effects on parental work, led to improved well-being for families with children.

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TABLES AND FIGURES

Table 1: Descriptive Statistics for Analytical Samples

	CPS		**Pulse**	
	Mean	St. Dev.	Mean	St. Dev.
Employment rate	0.746	0.435	0.795	0.404
Labor force participation rate	0.781	0.413	-	-
Age	36.28	10.47	35.98	6.42
Percent female	0.508	0.5	0.628	0.483
Family size	3.17	1.63	3.21	1.56
Number of children	0.918	1.22	1.10	1.23
N	504,364		478,026	

Note: Sample: adults between ages 18–65.

Table 2: Difference-in-Differences Estimates of the Effect of Expanded CTC on Employment Outcomes (Current Population Survey, April 2021 through December 2021)

	Binary Treatment		**Continuous Treatment** ($100s of Net Monthly Benefit Value)	
	1: Employed	2: Active in Labor Force	1: Employed	2: Active in Labor Force
Household with Children	0.042***	0.035***	0.000	-0.000
	(0.004)	(0.004)	(0.001)	(0.001)
Household with Children X Post-July 15	-0.002	0.001	0.001	0.002
	(0.005)	(0.005)	(0.001)	(0.001)
Pre-Treatment Mean among Households with Children	0.727	0.768	0.727	0.768
Observations	504,364	504,364	502,112	502,112

Note: Sample: adults between ages 18–65. All models include state and month fixed effects and controls for age, education, and sex of individual. Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 3: Difference-in-Differences Estimates of the Effect of Expanded CTC on Employment Outcomes (U.S. Census Household Pulse Survey, April 14 through December 13, 2021)

	Binary Treatment		**Continuous Treatment** ($100s of Net Monthly Benefit Value)	
	1: Employed (Intent to Treat)	2: Employed (Treatment on Treated)	3: Employed (Intent to Treat)	4: Employed (Treatment on Treated)
Household with Children	0.005	0.005	-0.008***	-0.008***
	(0.004)	(0.004)	(0.001)	(0.001)
Household with Children X Post-July 15	0.003	0.005	0.001	0.001
	(0.006)	(0.009)	(0.002)	(0.002)
Pre-Treatment Mean among Households with Children	0.701	0.701	0.701	0.701
Observations	478,026	478,026	416,071	416,071

Note: Sample: adults between ages 18–65. All models include state and week fixed week effects and control for age, education, and sex of respondent. Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 4: Difference-in-Differences Estimates of the Effect of the Change in Relative Wage on Employment Outcomes (Current Population Survey and U.S. Census Household Pulse Survey)

	CPS		**Pulse**	
	1: Employed	2: Active in Labor Force	3: Employed	4: Employed (Treatment on Treated)
% Change in Relative Wage	-1.037***	-0.845***	-0.979***	-1.142***
	(0.086)	(0.089)	(0.132)	(0.144)
% Change in Relative Wage X Post-July 15	0.025	-0.045	-0.036	-.241
	(0.087)	(0.083)	(0.131)	(.227)
Pre-Treatment Mean among Households with Children	0.752	0.785	0.761	0.761
Observations	504,364	504,364	478,026	478,026

Note: Sample: adults between ages 18–65. All models include state and month fixed effects and controls for age, education, and sex of individual. Robust standard errors in parentheses clustered at the state level. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 5: Difference-in-Differences Estimates of the Effect of Expanded CTC on Employment Outcomes with March 2021 as Treatment Start Month (CPS, January 2021 through December 2021)

	Binary Treatment		**Continuous Treatment** ($100s of Net Monthly Benefit Value)	
	1: Employed	2: Active in Labor Force	1: Employed	2: Active in Labor Force
Household with Children	0.038***	0.032***	-0.000	-0.001
	(0.003)	(0.004)	(0.001)	(0.001)
Household with Children X Post-March 15	0.003	0.004	0.001	0.002
	(0.003)	(0.003)	(0.001)	(0.001)
Pre-Treatment Mean among Households with Children	0.714	0.762	0.714	0.762
Observations	636,401	636,401	633,490	633,490

Note: Sample: adults between ages 18–65. All models include state and month fixed effects and control for age, education, and sex of individual. Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 6: Seasonality Test: Difference-in-Differences Estimates of the Effect of July 2020 Treatment on Employment Outcomes (CPS, January 2020 through December 2020)

	Binary Treatment		**Continuous Treatment** ($100s of Net Monthly Benefit Value)	
	1: Employed	2: Active in Labor Force	1: Employed	2: Active in Labor Force
Household with Children	0.039***	0.034***	0.001	0.001*
	(0.003)	(0.003)	(0.001)	(0.001)
Household with Children X Post-July 15	-0.001	-0.004	-0.000	-0.001
	(0.003)	(0.003)	(0.001)	(0.001)
Pre-Treatment Mean among Households with Children	0.704	0.767	0.704	0.767
Observations	705,905	705,905	702,853	702,853

Note: Sample: adults between ages 18–65. All models include state and month fixed effects and control for age, education, and sex of individual. Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 7: Difference-in-differences Estimates of the Effect of the CTC Expansion on Employment Outcomes Using the Callaway and Sant'Anna (2020) Methodology and Defining Treatment Group by the Additional Monthly CTC Payment Received (CPS, January 2021 through December 2021)

Treatment-Group: Monthly Additional CTC Payments	**Treated Units**	**Effect Estimate**	
		1: Employed	**2: Active in Labor Force**
All Treated Households	208,572	0.004	0.006
		(0.004)	(0.004)
$100	6,701	-0.009	-0.006
		(0.013)	(0.012)
$125	17,000	-0.011	-0.009
		(0.009)	(0.009)
$150	10,787	0.007	0.009
		(0.014)	(0.013)
$175	39,616	0.0003	0.004
		(0.007)	(0.007)
$200	5,355	0.006	0.011
		(0.019)	(0.019)
$225	7,123	0.022	0.035
		(0.019)	(0.017)
$250	17,930	-0.010	0.0001
		(0.009)	(0.009)
$325	11,419	-0.008	-0.003
		(0.013)	(0.011)
$350	24,882	-0.005	-0.001
		(0.009)	(0.008)
$375	11,787	-0.003	0.001
		(0.011)	(0.01)
$525	17,082	0.007	0.012
		(0.010)	(0.010)
$675	6,182	0.024	0.025
		(0.016)	(0.015)

Note: Sample: adults between ages 18–65. All models include controls for age, education, and sex of household head. Each treatment group is defined by the additional monthly CTC payments as a result of the CTC expansion– rounded to the nearest $25. Presented treatment groups are those with at least 1% of the sample. Robust standard errors in parentheses are clustered at the state level. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 8: Difference-in-Differences Estimates of the Effect of the CTC Expansion on Employment Outcomes Using the Callaway and Sant'Anna (2020) Methodology and Defining Treatment Group by The Number and Age of Children (CPS, January 2021 through December 2021)

Treatment-Group: Children ages: $0 \leq x < 6$	Treatment-Group: Children ages: $6 \leq x < 18$	Treated Units	Effect Estimate	
			1: Employed	2: Active in Labor Force
All Treated Households		208,572	0.004 (0.004)	0.006 (0.004)
0	1	46,206	0.002 (0.005)	0.003 (0.005)
0	2	37,703	0.001 (0.006)	0.002 (0.005)
0	3	13,158	-0.0003 (0.006)	0.003 (0.006)
0	4	3,523	-0.0001 (0.007)	0.0001 (0.007)
1	0	31,145	-0.003 (0.006)	0.001 (0.005)
1	1	21,477	0.006 (0.008)	0.006 (0.007)
1	2	11,045	-0.001 (0.006)	0.0001 (0.006)
1	3	3,990	-0.0001 (0.006)	0.002 (0.007)
2	0	15,782	-0.003 (0.007)	-0.0007 (0.006)
2	1	6,402	-0.001 (0.007)	0.0004 (0.007)
2	2	2,649	0.001 (0.007)	0.002 (0.007)

Note: Sample: adults between ages 18–65. All models include controls for age, education, and sex of household head. Each treatment group is defined by the additional monthly CTC payments as a result of the CTC expansion– rounded to the nearest $25. Robust standard errors in parentheses are clustered at the state level. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 9: Difference-in-Differences Estimates of the Effect of the CTC Expansion on Employment Outcomes Using the Callaway and Sant'Anna (2020) Methodology and Defining Treatment Group by the Change in the Relative Wage (CPS, January 2021 through December 2021)

Treatment-Group: Change in the Relative Wage	**Treated Units**	**Effect Estimate**	
		1: Employed	**2: Active in Labor Force**
All Treated Households	208,572	0.004	0.006
		(0.004)	(0.004)
-1% Δ in Relative Wage	18,263	-0.0001	0.003
		(0.007)	(0.006)
-2% Δ in Relative Wage	27,455	0.001	0.004
		(0.006)	(0.006)
-3% Δ in Relative Wage	41,780	-0.001	0.002
		(0.005)	(0.005)
-4% Δ in Relative Wage	16,830	0.003	0.006
		(0.007)	(0.006)
-5% Δ in Relative Wage	22,265	-0.002	0.002
		(0.006)	(0.006)
-6% Δ in Relative Wage	16,686	0.003	0.004
		(0.007)	(0.007)
-7% Δ in Relative Wage	8,735	0.0003	0.003
		(0.006)	(0.007)
-8% Δ in Relative Wage	3,869	0.002	0.004
		(0.007)	(0.007)
≤ -9% Δ in Relative Wage	2,174	-0.0001	0.002
		(0.007)	(0.007)

Note: Sample: adults between ages 18–65. All models include controls for age, education, and sex of household head. Each treatment group is defined by the additional monthly CTC payments as a result of the CTC expansion– rounded to the nearest $25. Robust standard errors in parentheses are clustered at the state level. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Figure 1: Mean Net Gain in CTC Benefits per Month by the Number of Children in Household and Family Type

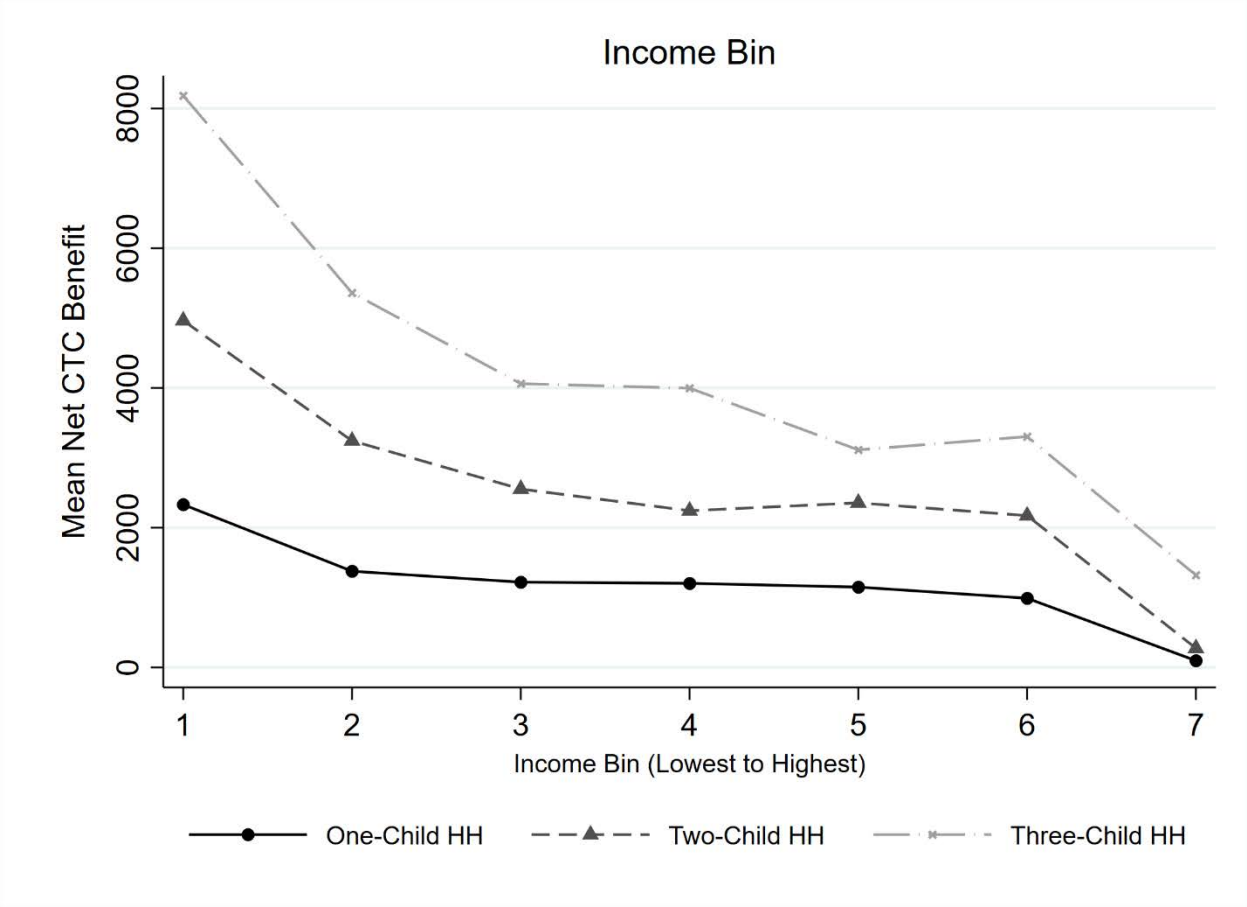
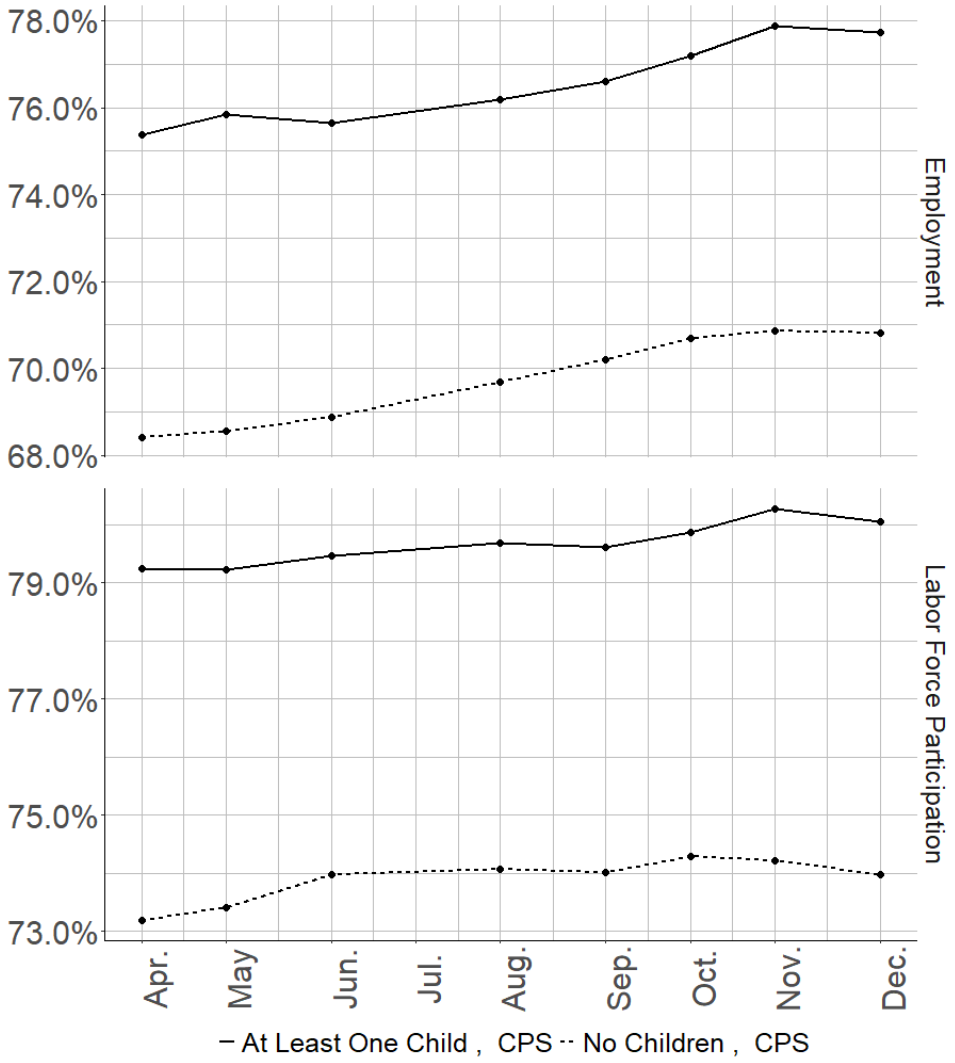
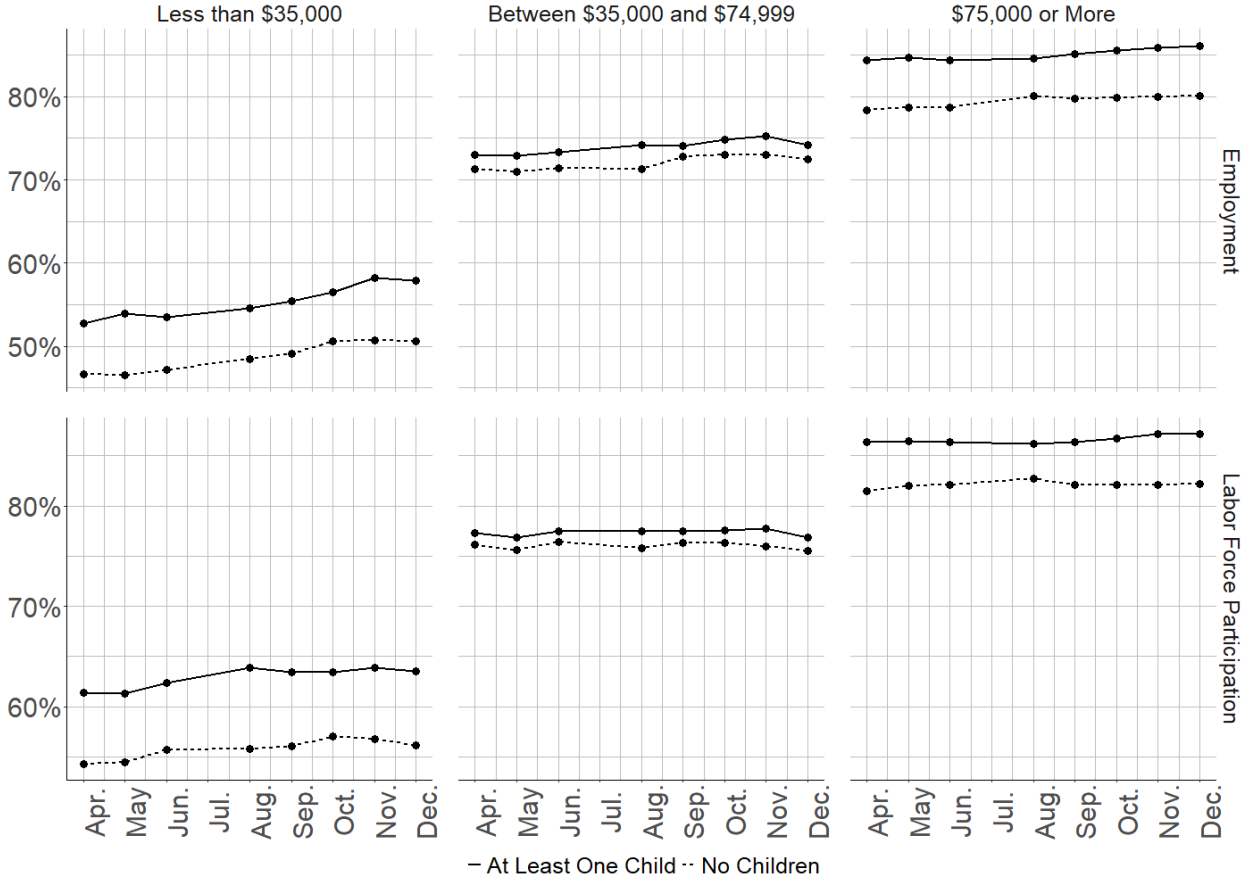


Figure 2: Trends in Employment and Labor Force Participation by Presence of Child in Household from April 2021 to December 2021, Current Population Survey



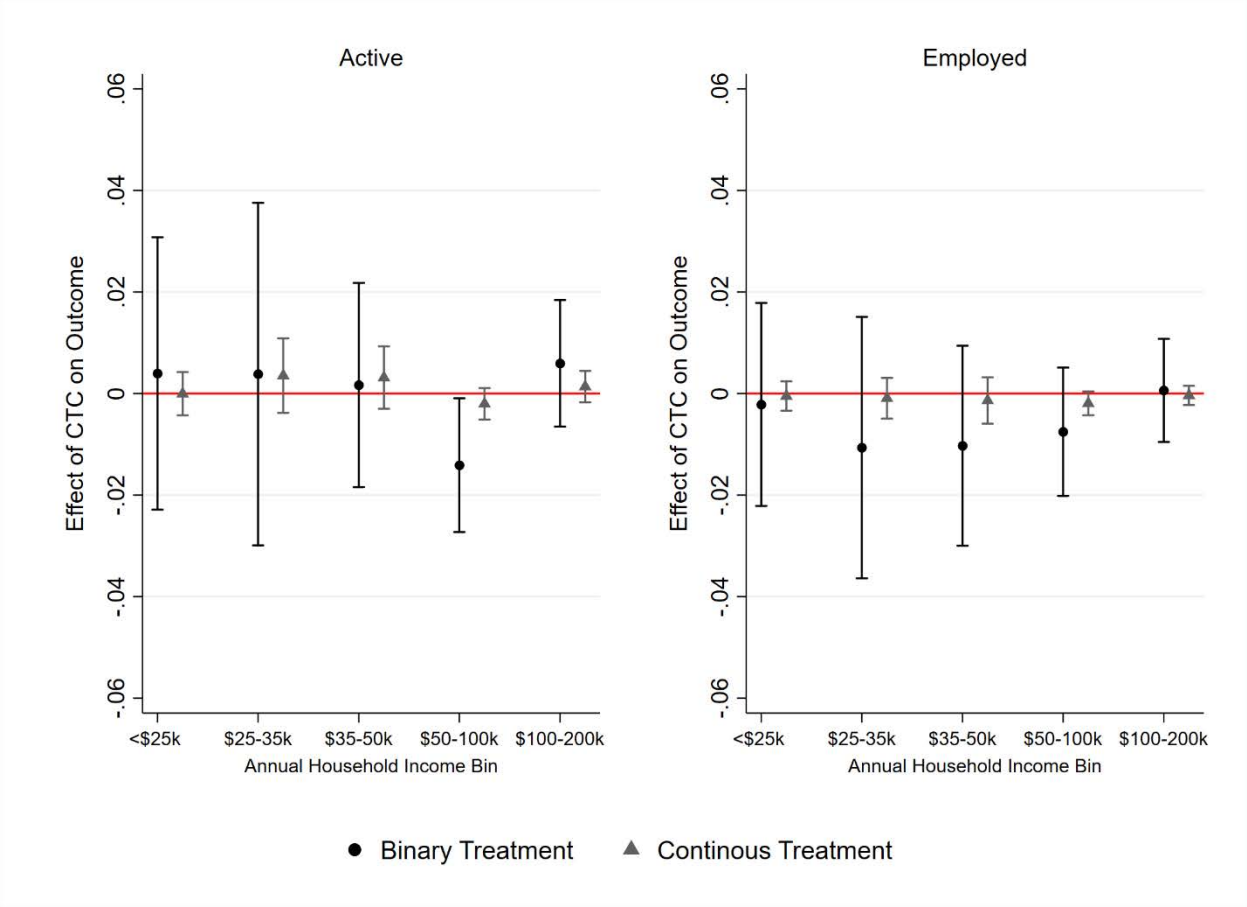
Note: This figure presents both the employment and labor force participation rates from the monthly CPS among respondents between the ages of 18 and 65 from April 2021 to December 2021. These rates are split between childless households and those with at least one child present in the household.

Figure 3: Trends in Employment and Labor Force Participation by Presence of Child in Family and Income Group from April 2021 to December 2021, Current Population Survey



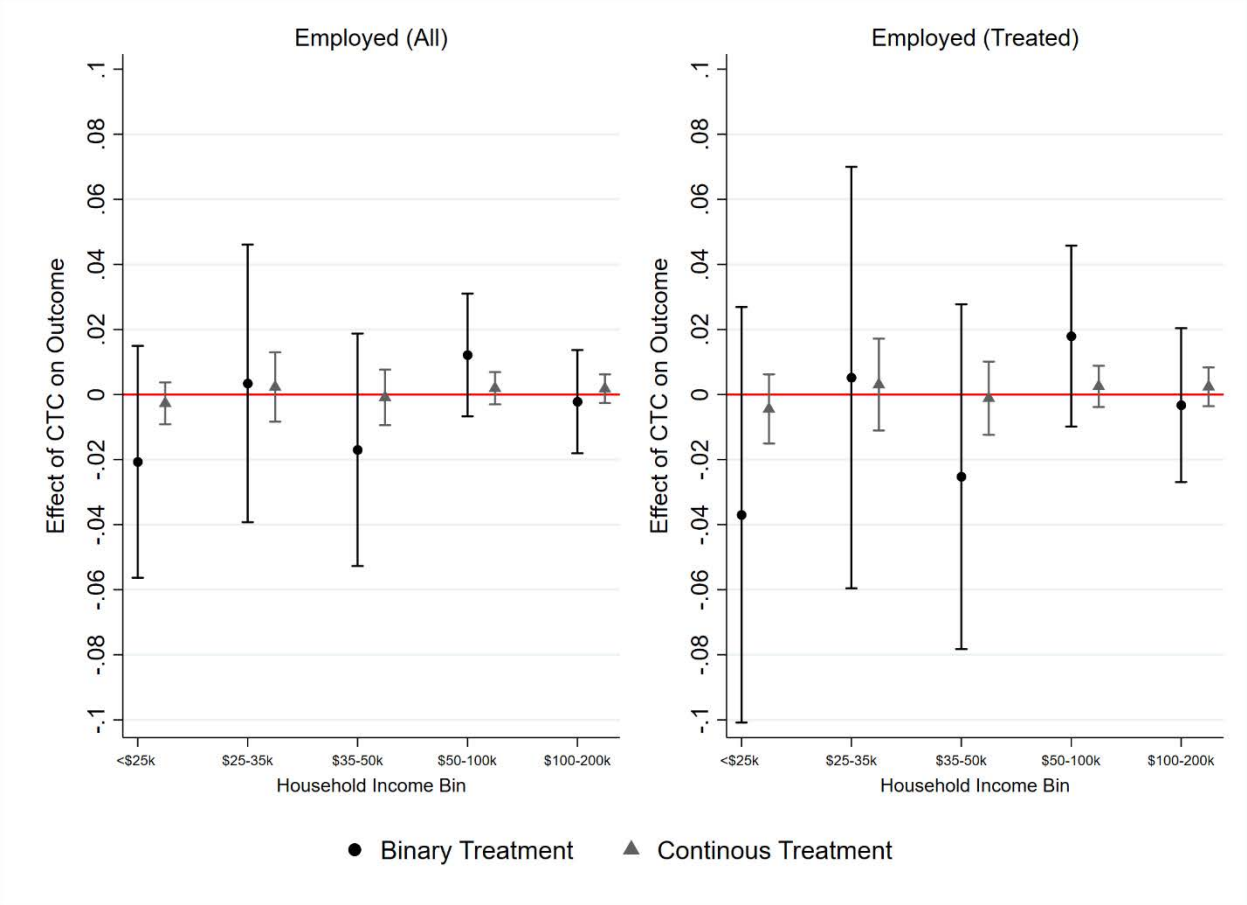
Note: This figure presents both the employment and labor force participation rates from the monthly CPS among respondents between the ages of 18 and 65 from April 2021 to December 2021. These rates are split between childless households and those with at least one child present in the household, as well as three income groups, those with household incomes less than $35,000, those with household incomes between $35,000 and $74,999, and those with household incomes greater than or equal to $75,000.

Figure 4: Heterogeneous Effects by Income Bin (U.S. Current Population Survey, April – December 2021)



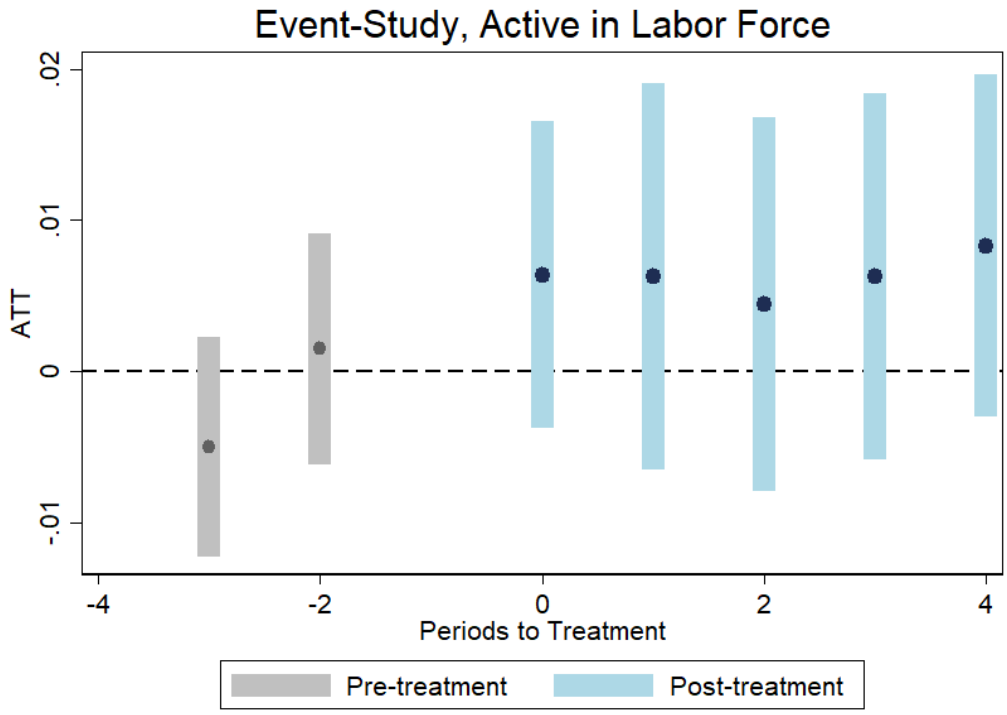
Note: Continuous treatment indicator represents the effect of a $100 net increase in monthly benefit value.

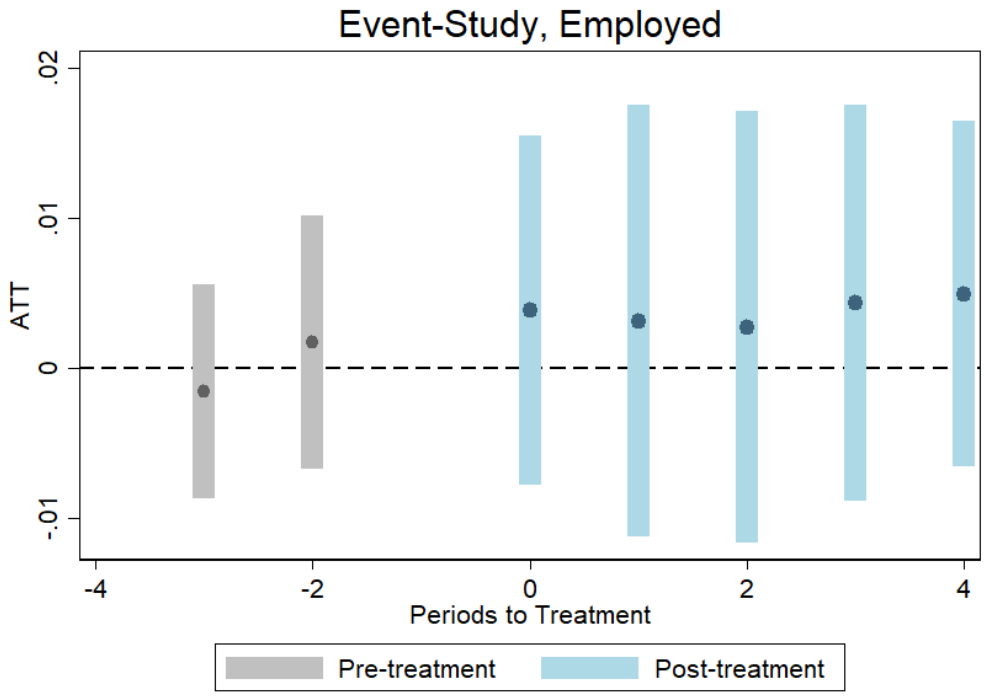
Figure 5: Heterogeneous effects by income bin (U.S. Census Household Pulse Survey, April – December 2021)



Note: Continuous treatment indicator represents the effect of a $100 net increase in monthly value. "Treated" represents the treatment effect (effect of the CTC) on the treated (respondents reporting receipt of the CTC).

Figure 6: Event Study of the Effect of CTC Expansion on Labor Force Participation and Employment using the Current Population Survey from April 2021 to December 2021.





Note: Periods define the number of months since treatment occurred. The first month of treatment is in period zero. Bars represent a 95% confidence interval. Treatment is defined as eligibility for the CTC after the expansion occurred.